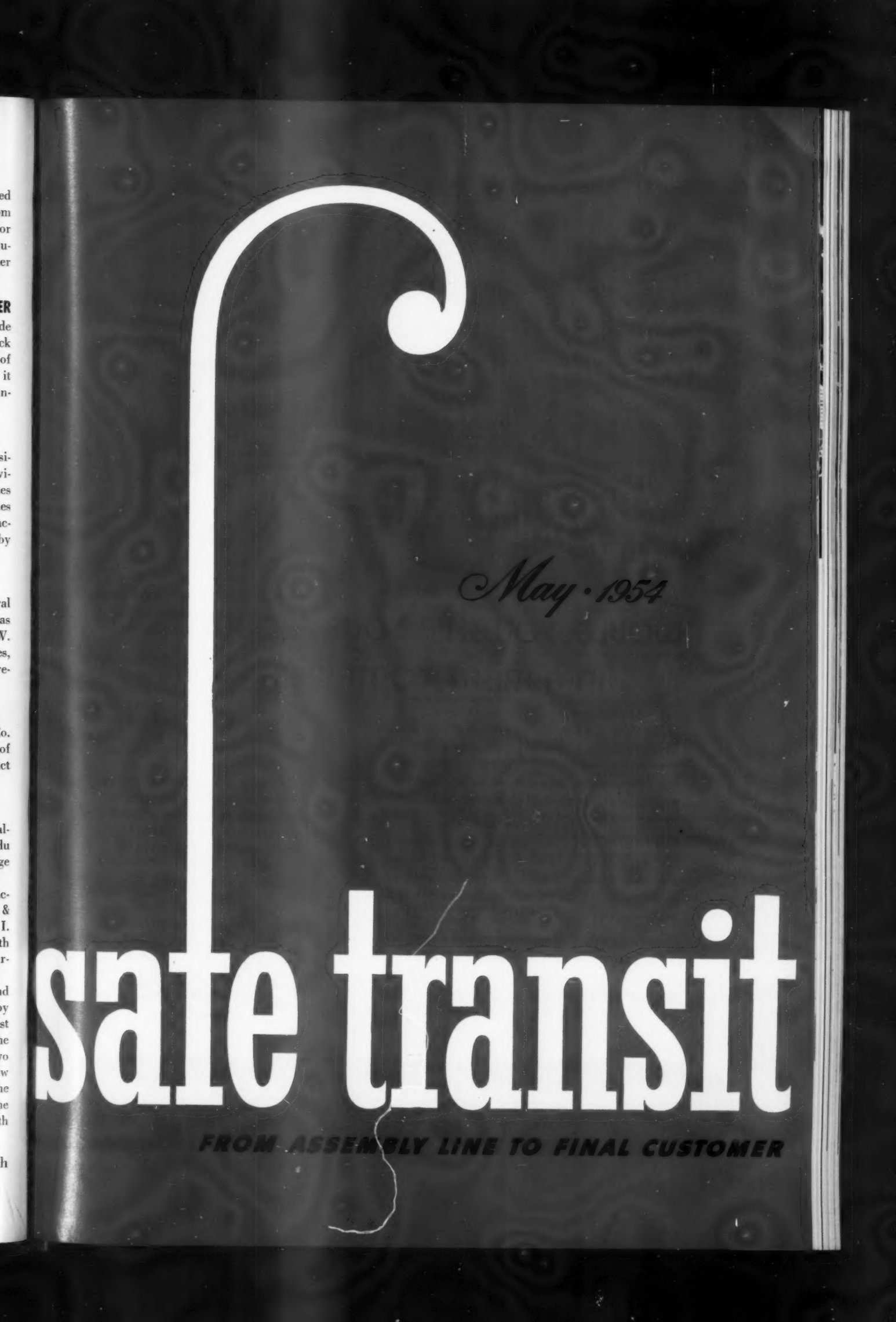
May · 1954
sale transit
FROM ASSEMBLY LINE TO FINAL CUSTOMER

WOULD YOU SHIP YOUR PRODUCT IN A MISFIT CONTAINER?

The wrong size of hat may look funny, but the wrong shipping container is no laughing matter. More often than not, it is the cause of excessive shipping losses, damage claims and transportation charges.

SUPERSTRONG laboratories are maintained for the design of perfectly balanced boxes and crates that will enable a product such as yours to be shipped safely, compactly and economically.

Nearly a century of experience and dependability recommends SUPERSTRONG as a source of known quality for your shipping container requirements.

WIREBOUND BOXES and CRATES
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CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS · · · PALLETS

SHIPPING TRADE SUPERSTRONG MARK CONTAINERS REG. U.S. PAT. OFF.

RATHBORNE, HAIR and RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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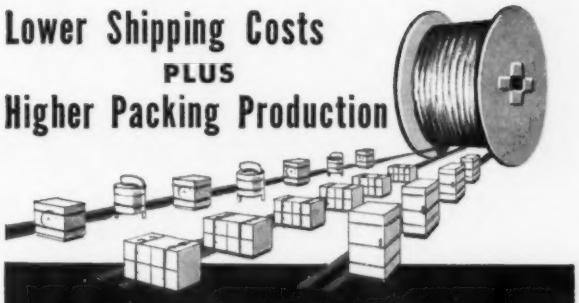
Lower Shipping Costs
PLUS
Higher Packing Production



with cush-on-strap

Cush-On-Strap is *strong as a giant but gentle as a lamb* . . . ideal for protective packing of all types of appliances and other finished metal and wood products.

8 reasons why Sackner's CUSH-ON-STRAP will help you

1 **ONE PACKAGE**—high grade steel banding for strength; and protective, soft, fluffy cellulose padding, — all in one unit.

2 **CUTS LABOR COSTS**—one man does the work of two. Standard tools used.

3 **STEPS UP PACKING PRODUCTION**—lowers your packing costs.

4 **READY TO USE** the minute it arrives—no delay in measuring and cutting; lengths pre-determined; no waste; metal pre-scored for ease in breaking in lengths required for your product; 6-inch spacings permit quick application with the clinching tool; stripped for 6 inches at both ends of the length; comes to you on a convenient fibre throw-away reel.

5 **ELIMINATES FUSSY PRE-ASSEMBLY.**

6 **NO SHIPPING DAMAGE** —eliminates broken catches, hinges, drawer tracks, etc., — preventing costly replacements.

7 **WILL NOT STAIN OR MAR THE FINEST FINISHES.**

8 **WIDE RANGE OF USES** —for packing automotive finished parts, dish washers, household furniture, ironers, machinery, metal kitchen units, office equipment, ranges, refrigerators, scales, washing machines, x-ray equipment, etc.

CUSH-ON-STRAP is one result of 37 years experience in converting cellulose paper, jute, cotton and other raw materials into braided, twisted, shaped, laminated and woven products for the furniture, automotive, electrical, packaging and other industries.

USE THE COUPON to learn how we can serve you in the packing and shipping of your products.

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Grand Rapids, Michigan

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GRAND RAPIDS 2, MICHIGAN

How Hotpoint coordinates packing and handling of refrigerators and ranges

illustrated with finishfotos

When Hotpoint Company made plans for its new refrigerator plant in Chicago, which is now in operation across the street from its modern range plant, provision was made in the new plant for the packaging of both ranges and refrigerators.

Formerly, the packaging, warehousing and carloading of ranges was done in the range plant's huge warehouse which is now devoted to fabrication and finishing operations for refrigerators.

Now both ranges and refrigerators are packaged in the new building housing refrigerator assembly, warehousing and carloading.

Refrigerators are packaged on a continuation of the assembly line, while ranges, delivered by an overhead roller conveyor from the range plant, are packaged in the warehouse proper. Both packaging lines converge at one point in the warehouse where a "switchman" controls the order in which they arrive, and whether they will go direct to storage, or into solid carloads or mixed carloads for shipment to distributors and dealers.

Packaging refrigerators

At the start of final assembly, two wooden supports are bolted to the bottom of each refrigerator. These supports carry the unit through final assembly and on to the packaging area. Tags and labels, operation sticker, and use instructions are attached with pressure sensitive tape.

Shelves, wrapped in a roll of corrugated paper secured with tape, are then placed inside the cabinet. Cartoned chiller trays are placed on top of the wrapped shelves. Another carton containing crisper pans and ice cube trays and other accessories (depending on the model) is placed in the bottom of the unit.

Small components are packaged on a belt conveyor paralleling the main assembly line. The packaged parts are immediately stacked near the packaging conveyor.

As the unit moves down the line, stain-resistant flatback masking tape is placed around the body of the refrigerator where the door closes. Wax paper is placed between the door frame and door to protect the door gasket. Creped cellulose wadding, secured with tape, is inserted at the corners between the door and the bottom panel.

After all interior packaging and cushioning is complete, built-up corrugated pads with creped cellulose facing are wrapped around the entire refrigerator, with two sets of the encircling pads used for small units and three for larger units. The built-up pads provide support between the unit and the container. The pads are secured with $\frac{3}{8}''$ precut steel strapping which is tensioned with a pneumatic stretcher. The pads are scored to help hold the strapping in place.

Just before the appliance reaches the final packing station, it passes over a roller conveyor section placed between two sections of belt conveyor. Here the unit (bolted to the two wooden supports) rolls onto the bottom carton "cap". This cap has built-up pads between it and the wooden base strips to provide additional cushioning to the unit.

At the final packaging station, the corrugated carton (consisting of a tube and strapped top cap) is dropped over the refrigerator. Interior prefabricated corrugated packing sheets are inserted the full length of the unit on both sides. (These sheets have two built-up edges which are "fabricated" by rolling the edge to form four thicknesses which are then secured with hand-operated air-staplers. This operation is performed adjacent to the packing line.)

The top cap interlocks with the tube and, reinforced with strapping, has sufficient strength to permit the packaged appliance to be carried with the aid of a lift flange inserted under the top flap.

The flaps on the bottom cap are folded in position and secured with strapping. The completely packaged unit then continues on the same conveyor to the warehouse.

Packaging ranges

Packing operations on ranges begin before final assembly is completed. A wooden base is secured to the bottom of the unit with carriage bolts and locknuts. (The base is assembled in an automatic nailing machine, using pre-cut lumber.) This base carries the range on through final assembly and packaging.

First packaging operation is taping cellulose wadding at the corners between the oven doors and the body. The oven doors are then taped shut, and other movable parts secured with tape.

From the assembly line, ranges move to an elevator which carries them to an overhead conveyor leading to the warehouse where final packing takes place.

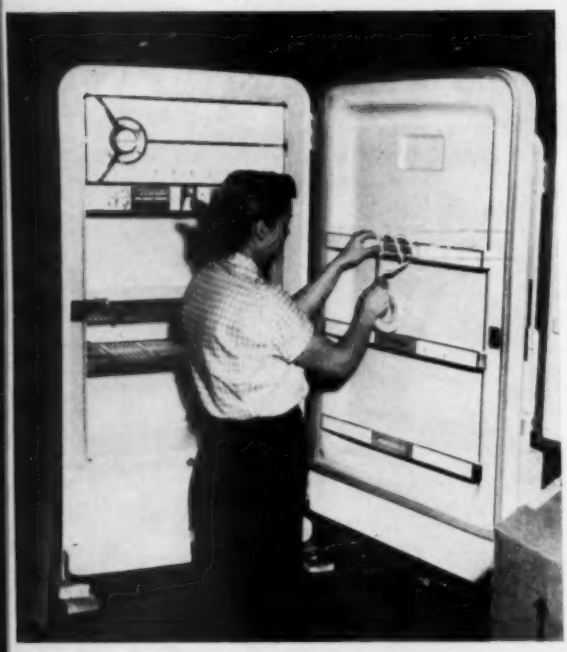
As the range moves down the conveyor, final packaging operations prior to cartoning include the addition of a corrugated fibreboard "cap" around the folded back splasher and

to Page ST-7 →

Overhead cranes using special lifting device can handle four packaged refrigerators at one time in the big Hotpoint warehouse. The top cap of the container, which interlocks with the tube or sleeve and is reinforced with steel strapping, has sufficient strength to permit the packaged refrigerators to be carried with the aid of lift flange inserted under top container flap.

Left: Small components are packaged on belt conveyor paralleling the main assembly line.

Right: Fabricating cap, and attaching to one end of "sleeve" which will form the top of the package.



Left: Tags and labels, operation sticker and use instructions are attached here. Tape is used to secure the glass shelf.

Right: Small air operated metal stitchers are used for minor fabrication on interior packing sheets.

Left: Shelves are wrapped with corrugated paper and secured with tape. Cartoned chiller tray is placed on top of shelves. Carton at bottom contains pans and ice cube trays.

Right: Slipping the container (top cap and sleeve) over the refrigerator. In right foreground is area where interior packing is fabricated.

*anges move down con-
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include taping cush-
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a corrugated fiber-
rd "cap" is placed
und folded back-
splasher.*

Built-up corrugated pads with creped cellulose facing are wrapped around the entire refrigerator. The pads are secured with pre-cut steel strapping which is tensioned with a pneumatic stretcher.

→ *from Page ST-4*

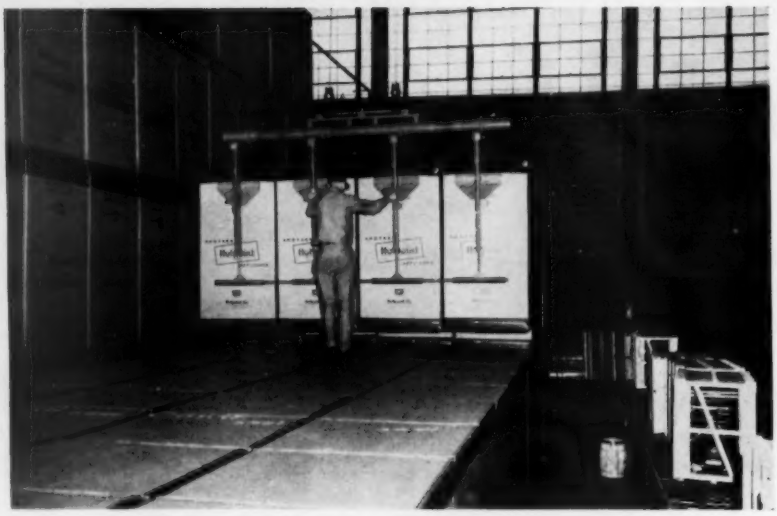
the top edge of the range. This cap is secured with pre-cut steel strapping which is tensioned with a pneumatic stretcher.

Pressure-packing ranges

Next the carton is slipped over the range, and vertical interior supports are inserted between the carton and the unit. Then a cap is placed on top, and the bottom cap is laid in position in the carton sealing machine to be picked up by the entire package as it moves into the sealer.

As the packaged range is conveyed into the machine, it passes stationary guides which "plow" the lengthwise flaps into sealing position. Glue is applied to the flaps which are then moved into final sealing position — pressed against the box — and the packaged range moves through a "compression" chamber.

The lengthwise flaps are thus sealed, and the range goes to the end of the first section of the sealer. Here the



Four packaged refrigerators can be handled at one time in the warehouse with special handling device used in conjunction with overhead cranes. Conveyor on right, carrying crated ranges, also moves packaged refrigerators to the carloading area.

box hits a trigger which actuates a 90° change of direction (without turning the box itself) so that it is ready to travel through the second section of the machine for sealing the end flaps.

As the packaged range emerges from the sealer it is shunted onto another conveyor leading to warehouse storage or carloading.

Range, refrigerator lines converge in warehouse

A special feature of Hotpoint's new warehouse permits the shipment of mixed car lots to distributors and dealers. The range and refrigerator packaging lines merge at a point in the storage and loading area. A "switchman" controls the order in which the appliances arrive, and where they go.

The packaged products can be switched either directly to carloading or into one of six storage bays. These bays are 100 feet wide and 300 feet long. Overhead cranes above each bay allow rapid storage of ranges and refrigerators.

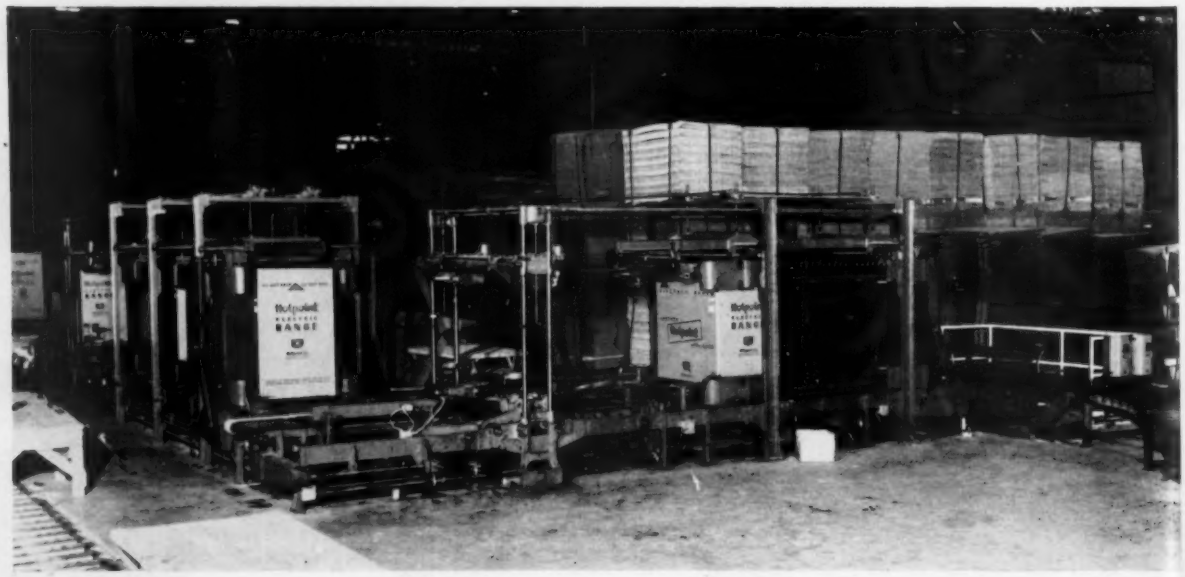
A centralized system permits crane operators in each bay to direct ranges or refrigerators into a desired area, eliminating manual handling of packaged appliances. When an appliance is moved into a designated bay, it is directed to one of two conveyors in the bay. One conveyor is used for make-up and the other for movement of appliances into storage.

Statistics

- **3 miles of pressure sensitive tape used per day**
- **1500 pounds of steel strapping used per day**
- **25 tons of corrugated fibre board used per day**
- **4000 square feet of crepe cellulose used per day**
- **10.9 miles of conveyors used throughout the plants**

The entire system is geared to eliminate human handling as much as possible, and enables Hotpoint to load mixed lots directly into cars from assembly lines.

An overall view of the sealing machine for "pressure packing" electric ranges. Ranges move straight down packaging line (left) into the sealer. Conveyor on right carries packaged ranges on to juncture point with conveyor bringing packaged refrigerators into the warehouse.



CUSTOM DESIGNED

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HOT POINT REFRIGERATORS

Hot Point ships their Refrigerators in INTERNATIONAL's specially designed cap and tube shipping containers with these outstanding results.

- **Special Interlock-type cap and tube construction permits easier and more efficient lifting holds—without the use of forks or gripping irons. Four are stacked at a time.**
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- **You need no hammers, pinchbars or nails —minimum of uncrating hazards.**
- **Dustproof construction.**
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- **This custom-designed, heavy-duty shipping container is approved by the Freight Classification Committee and is accepted by the railroads as an approved container.**

We will gladly tell you how this versatile, sturdy container can be designed to meet your specific needs. Write us at any of our manufacturing plants listed below.

TOP
STEEL BAND OR WIRE
SIDE WALL
LIFT TRUCK FLANGE ENTERS HERE
The lift truck inserts the lifting flange under one side of cap and pulls up. The strong construction enables sure, fast lifting and close stacking without usual jostling.

International Paper company

CONTAINER DIVISION

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Nailed or Hinge Corner
Cleated Plywood
Cleated Craveneer
Cleated Corrugated
Watkins Type Containers
Shop and Tote Boxes
Woodsteel Nesting Boxes

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FOR PEACE OR DEFENSE

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Experienced engineers and crate designers use the latest in testing equipment in search for weakness that may result in transit damage to your valuable finished products. Assurance of safe arrival will result from pre-shipment testing in our National Safe Transit certified laboratory. Avail yourself of this service.

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Plants at: Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
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Packaging show draws 25,000 visitors

packaging materials and equipment displayed by 360 exhibitors

TOTAL attendance at the 23rd National Packaging Exposition, held April 5-8 at Convention Hall in Atlantic City, was estimated at 25,000 by a spokesman for the American Management Association, sponsors of the annual event. It was the largest packaging show ever held in Atlantic City, and was second only to last year's show held in Chicago.

Packaging materials and equipment were displayed by 360 exhibitors. The exhibits occupied 130,000 square feet of floor space.

Packaging conference

Some 1,100 packaging executives registered for the Packaging Conference held in conjunction with the exposition. Twenty-five speakers discussed trends in the industry, and present case studies of company practices in specific areas of packaging.

Industrial packaging problems

Paul O. Vogt, packing, warehousing and shipping consultant, General Electric Co., Schenectady, N.Y., was chairman of a panel discussion on "Problems and Solutions in Industrial Packaging Today."

Panel members included Robert Anderson, packaging methods supervisor, Sperry Gyroscope Co.; Ray A. Tritten, chief factory engineer, Carrier Corp.; and B. R. Sackett, assistant sales executive, SKF Industries, Inc.

Anderson described how Sperry packages the delicate products which require unusual cushioning, cradling and shipping techniques.

Sackett elaborated on the difficulties in preventing corrosion, in storing, labeling, cartoning and in adapting machinery for hand packing.

Carrier packaging methods

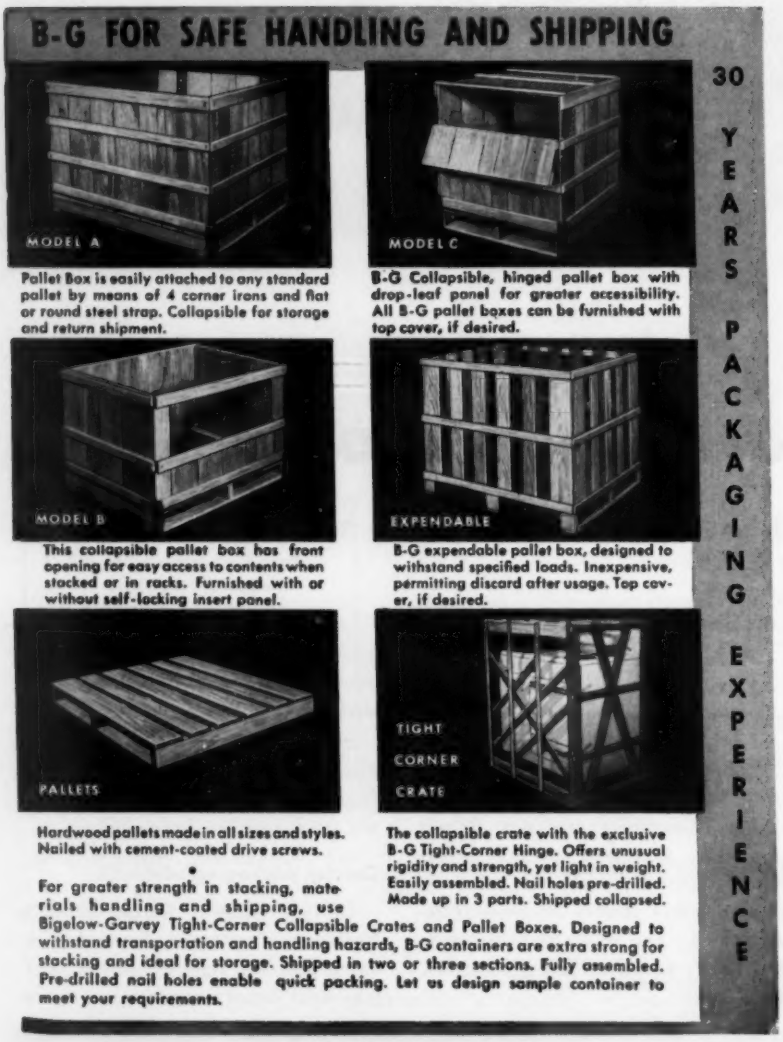
Every product of Carrier Corp. is treated as a special individual packaging problem, reported Ray A. Tritten, chief factory engineer. →

Floyd L. Triggs (right), of Riegel Paper Co. and outgoing chairman of AMA Exhibitors Advisory Committee, congratulates Richard Wellbrock, of New Jersey Machine Corp., and new chairman.

Tritten described the development of typical packages for room air conditioners, store "Weathermakers," house air conditioners, and food freezers. Room air conditioner packaging, he said, has been modified to meet increased volume and the requirements of changed marketing methods.

A new room air conditioner package was introduced last year, he said, to replace one that presented the following problems: The container was relatively high priced and, because it was rigid, transmitted shocks directly to the air conditioning unit. Adequate clearance had to be provided around the unit for protection of the paint. The light decorative grille was often damaged in shipping. It was necessary to attach the crate to the unit by means of holes in the base pan. The packaged unit was unwieldy and hazardous to handle by hand. Uncrating in a customer's home created a nuisance and sometimes damage.

Discussing problems and solutions in industrial packaging at AMA Packaging Conference are, left to right: Robert Anderson, packaging methods supervisor, Sperry Gyroscope Co.; Ray A. Tritten, chief factory engineer, Carrier Corp.; and B. R. Sackett, assistant sales executive, SKF Industries, Inc.


B-G FOR SAFE HANDLING AND SHIPPING
30 YEARS PACKAGING EXPERIENCE
MODEL A
Pallet Box is easily attached to any standard pallet by means of 4 corner irons and flat or round steel strap. Collapsible for storage and return shipment.
MODEL C
B-G Collapsible, hinged pallet box with drop-leaf panel for greater accessibility. All B-G pallet boxes can be furnished with top cover, if desired.
MODEL B
This collapsible pallet box has front opening for easy access to contents when stacked or in racks. Furnished with or without self-locking insert panel.
EXPENDABLE
B-G expendable pallet box, designed to withstand specified loads. Inexpensive, permitting discard after usage. Top cover, if desired.
PALLETS
Hardwood pallets made in all sizes and styles. Nailed with cement-coated drive screws.
TIGHT CORNER CRATE
The collapsible crate with the exclusive B-G Tight-Corner Hinge. Offers unusual rigidity and strength, yet light in weight. Easily assembled. Nail holes pre-drilled. Made up in 3 parts. Shipped collapsed.
For greater strength in stacking, materials handling and shipping, use Bigelow-Garvey Tight-Corner Collapsible Crates and Pallet Boxes. Designed to withstand transportation and handling hazards, B-G containers are extra strong for stacking and ideal for storage. Shipped in two or three sections. Fully assembled. Pre-drilled nail holes enable quick packing. Let us design sample container to meet your requirements.
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Wooden Pallets
Model A Pallet Boxes
Model B Pallet Boxes
Model C Pallet Boxes
Kraft Crate
Wooden Boxes
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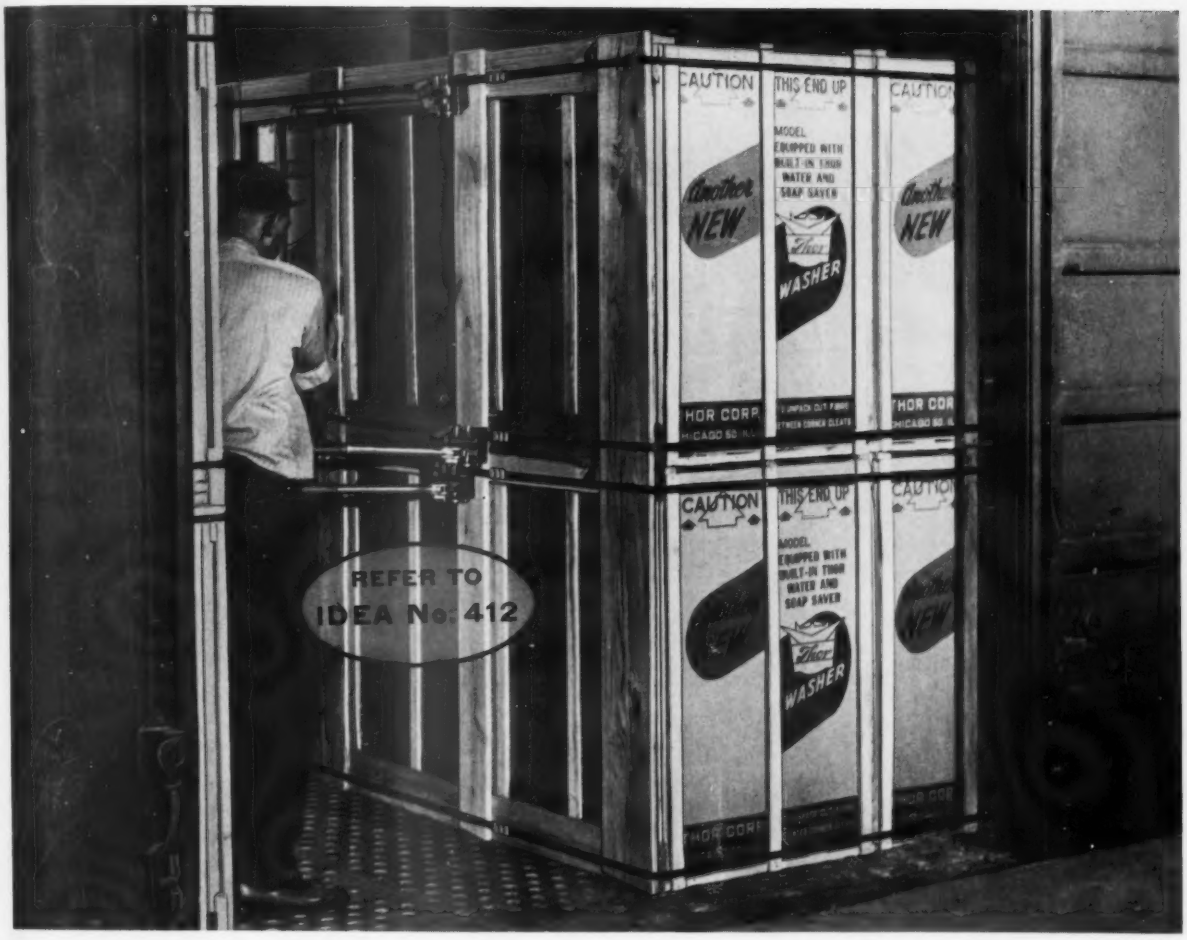
Reduced shipping damage

Now the rigid container has been replaced by a pressure-packed corrugated carton at a saving of material and a 10-minute reduction in the factory labor required to pack the unit. The new pressure pack absorbs rather than transmits shock; reported shipping damages have dropped from 1.3 per cent for the old pack to zero per cent for the basic unit package and six tenths of one per cent for the package containing the grille and accessories, now shipped separately. The baked enamel surface now is protected by waxing all cartons in direct contact with the unit. Design of the package for palletizing in stacks of three high reduced carloading time.

The store "Weathermaker" is packed in a plywood crate designed to meet heavy stacking loads.

The refrigeration and heating system together with the control wiring is packed in a wirebound crate.

Food freezers are packed in a returnable plywood crate for use if the product must be returned to the factory for servicing.



AIM* for Easier, Faster Carloading with Acme Steel Strapping Ideas

Help in solving this shipping problem came from Acme Idea Man, Art Hartley, of Chicago.

ask your
*Acme Idea Man
to help solve your problems

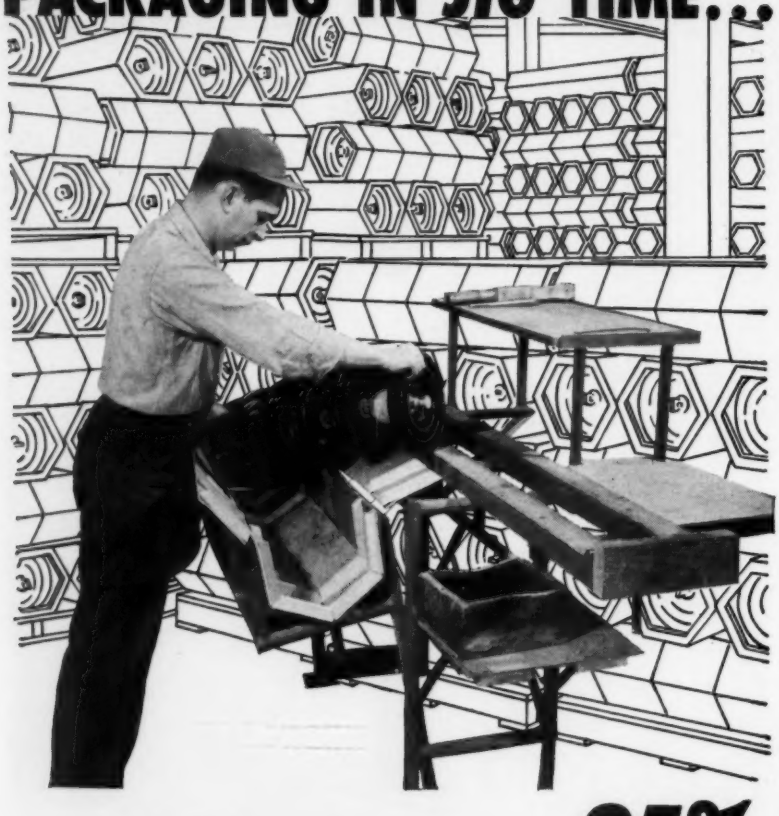
The efficiencies in modern methods of loading freight cars pay off for both the shipper and the consignee . . . in time saved and money saved. Acme Steel Strapping Idea #412 is helping prove this for Thor Corporation, Chicago. Washers, dryers and ironers are packed in cars by the "floating load" method. Because the entire load can shift on impact, up to 50% of the shock is dissipated without damaging the lading. By this Acme Steel method, loading time and dunnage costs are reduced. And since cumbersome wood bracing is no longer required, freight costs are lower. Unloading of the safely delivered appliances is underway after a simple snip of the steel strapping.

Ask your Acme Idea Man to demonstrate how you can give better protection to your shipments . . . at lower cost. Or, write Acme Steel Products Division, Dept. F-54, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois.

AIM *For Safe, Lower-Cost Shipping*

ACME STEEL

PACKAGING IN *JIG* TIME...



cut packaging costs 25%

with GENERAL ENGINEERED CONTAINERS

Packaging six porcelain insulators in a bulky nailed crate was a time-consuming two-man operation at Victor Insulators, Inc., Victor, New York. Introduction of the sturdy, lightweight General Wirebound Box and the jig-assembly system shown here enabled Victor engineers to reduce packaging to a quick, efficient, one-man operation, cut packaging costs by an estimated 25%. And their customers benefited by the substantial saving in on-site uncrating time—now a matter of seconds, thanks to General Wirebound Design.

This is only one example of hundreds of packaging problems solved each year—at a saving—in General Box Company's two fine Industrial Packaging Laboratories. General packaging experts stand ready to help *you* cut costs, too. Write today for complete details.

Find out how other manufacturers are cutting packaging costs. Write for your free copy of "The General Box."

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Factories: **Cincinnati; Denville, N. J.; Detroit, East St. Louis, Kansas City, Louisville, Milwaukee; Prescott, Ark.; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston, Texas.**

ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED

• Generalift Pallet Boxes • Corrugated Fiber Boxes • All-Bound Boxes
• Cleated Corrugated and Watkins-Type Boxes • Wirebound Crates and Boxes

CERTIFY LOVE BOX, INTL. PAPER LABORATORIES

The National Safe Transit Committee has announced the certification of two new laboratories, namely, International Paper Co.'s container division, St. Louis, Mo., and Love Box Co., Wichita, Kansas.

A total of 31 container and testing laboratories are now participating in the National Safe Tansit Program.

DAHILL RETIRES, KIVLIN SUCCEEDS TO AAR POST

The Freight Loss and Damage Prevention Section of the Association of America Railroads has announced the appointment of A. P. Kivlin as chief engineer of its Freight Loading and Container Bureau. He succeeds E. J. Dahill who retired.

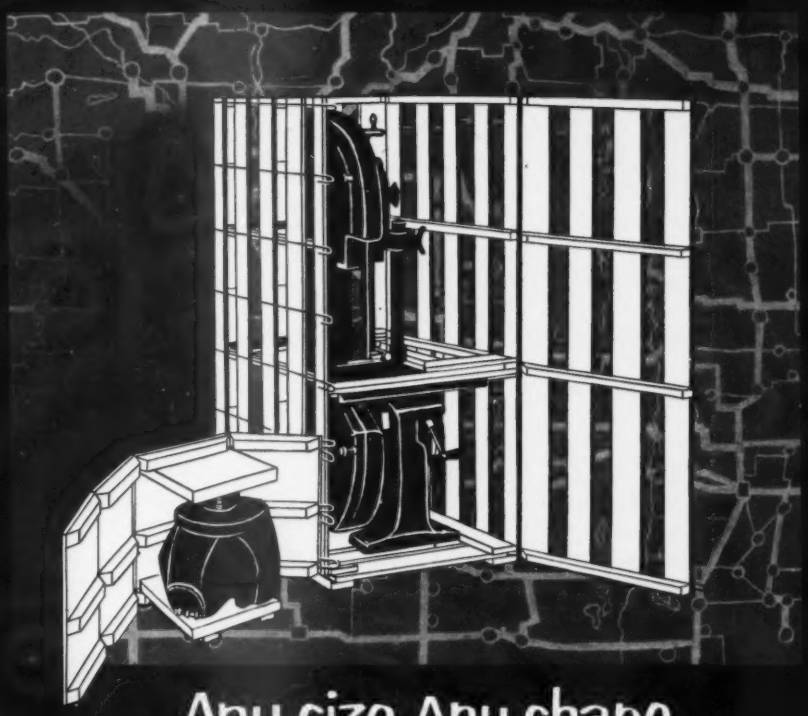
ANDERSON HEADS AAR CONTAINER LABORATORY

The Association of American Railroads has announced that C. R. Anderson, assistant chief engineer of the Freight Loading and Container Bureau, has been appointed chief of the Container and Loading Research and Development Laboratory of the Freight Loss and Damage Prevention Section.

SOUTHERN RAILWAY FILM ON "CARELESSNESS" PRESENTED TO NST COMITTEE

The operating department of the Southern Railway System has presented to the National Safe Transit Committee a copy of its motion picture entitled "The High Cost of Carelessness."

In commenting on the presentation, Ralph F. Bisbee, National Safe Transit general chairman, stated that the Southern Railway definitely feels that the reduction of transit and handling losses is a "two-way street", and they are attempting to parallel in their own system the work of manufacturers participating in the NST program.

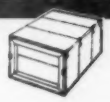


Any size, Any shape
No matter where it's bound
SHIP IT WIREBOUND!

There is practically no limit to what you can ship in a Wirebound . . . for Wirebound is *a most versatile container.* Wirebounds combine the strength of steel wire with the resiliency of wood in limitless combinations. For example, look at the rock bit box on the left. This small, rugged Wirebound eliminated previous stacking failure and in-transit damage losses. So did the Wirebound band saw crate on the right. For greater safety and greater savings, investigate Wirebounds . . . today!

MAIL THIS COUPON NOW!

Wirebound
BOXES & CRATES



WIREBOUND BOX MANUFACTURERS ASSOCIATION
Room 1154, 327 South LaSalle Street, Chicago, Illinois

☐ Have a sales engineer give me the whole story
☐ Send me a copy of "What to Expect from Wirebounds"

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Firm Name_____
Address_____
City, Zone and State_____

SAFE TRANSIT NEWS

NATIONAL SAFE TRANSIT COMMITTEE

DuPont Circle Building, 1346 Conn. Ave., N.W., Washington 6, D.C.

Safe Transit Companies Total 154 - New companies certified under the Safe Transit Program are: Ackermann Manufacturing Company, Wheeling, W. Va.; John Wood Company, Heater and Tank Division, Chicago, Ill.; Tennessee Stove Works, Chattanooga, Tenn.; Precision Grinding Wheel Co., Inc., Philadelphia, Penna.; The Sunray Stove Co., Delaware, Ohio; Clarostat Mfg. Co., Inc., Dover, N. H.; and The Toledo Porcelain Enamel Products Company, Toledo, Ohio.

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Safe Transit Laboratories Total 31 - Newly equipped Safe Transit Laboratories are: Container Divisions of International Paper Co. in Whippany, N. J. and St. Louis, Mo.; and Love Box Company, Wichita, Kansas.

- - - - -

Carolina Freight Carriers Corp. - As part of a continuing program to improve handling this organization's Claim Department is giving wide distribution to the March issue of their booklet, "Firing Line". The booklet is devoted exclusively to a pictorial story of the National Safe Transit label. Its purpose is to familiarize handling personnel with the Safe Transit label and to impress upon them that it is their responsibility to see that packages so identified are properly handled.

- - - - -

Southern Railway Film - Fully recognizing that Safe Transit is a Two-Way Street, the Southern Railway is making every effort to reduce carelessness in handling under their system. They recently finished production of a film entitled, "The High Cost of Carelessness". The Safe Transit Committee feels that the $50,000 production is one of the finest that has been made on this subject and that it will make a valuable contribution toward achieving the Program's objective of reducing in-transit losses to an absolute minimum. The Southern Railway System has presented a copy of the film to the National Safe Transit Committee for its use. It will be shown in conjunction with the Safe Transit film at a series of meetings scheduled by the Committee's Speakers Bureau.

- - - - -

Safe Transit Meetings at New Orleans and Tampa - Under the direction of Mr. R. F. Bisbee, General Chairman, NST Committee, two Safe Transit Programs were presented to carrier groups in New Orleans, La. and Tampa, Florida during the month of March. Both Programs included showings of the National Safe Transit Program film and preview showings of the new film on "Pre-testing of Basic Carloading". Also shown was the new Southern Railway Film. The meetings were attended by railroad and trucking personnel representing every branch of the carrying organizations having anything to do with handling or transportation of products coming into these two regions.

- - - - -

New Instrument Approved - In December 1952 United States Testing Company, Inc. was appointed the Committee's independent evaluating agency for instruments seeking approval under the National Safe Transit Program. Just approved for use on the Conbur Incline Testing Device is the Impact-O-Graph, Model HX, manufactured by The Impact-O-Graph Corporation, 1900 Euclid Avenue, Cleveland, Ohio. Meeting all the requirements of the Procedure, this is the second shock recorder to win the approval of the Safe Transit Committee for this purpose. Approved under the Program since its beginning has been the Two-Way Ride Recorder, manufactured by Impact Register Company, Champaign, Illinois. This instrument was recently retested by United States Testing Company and officially approved by the Committee under the new arrangement.

Amana gets a problem off its chest

HOT OFF THE LINE, this Amana Chest Freezer, now the pride of its maker, will soon be the pride of some home-owner. Problem was to get it to the new owners as flawless as when it left the factory. The sensible solution was to consult a packaging authority in this field for recommendations. That's when Atlas Plywood was called in.

READY TO TRAVEL. Atlas Plywood engineers designed a plywood container that would withstand bumps en route, in warehouse handling and in dealer delivery. Distributors praised the case because it provided full protection and relieved the headache of damage claims. Amana now packages its entire production in Atlas Plywood containers.

Can your shipping costs be cut?

Let's try. No charge if they can't. Big savings if they can. Ship us your products in their present containers. Then —

We'll test them, duplicating all conditions of actual transit. *You'll* get a full engineering report, along with the clinic's recommendation for any improvement in packaging that may be needed. And you're welcome to watch the tests.

This is a FREE service by Atlas Plywood. Without obligating you in any way it enables you to find out: (1) whether or not you can get a *safer* shipping container; (2) whether you actually *can* cut your present shipping costs, and; (3) just *how much* you can save.

Your Atlas Plywood representative (see Classified Telephone Directory) will be glad to make the arrangements. Or write to Atlas Plywood Corporation, 1432 Statler Building, Boston 16, Mass.

Atlas Plywood ®

CORPORATION

FROM FOREST TO FINISHED PRODUCT

Plywood Containers • *Flush Doors* • *Hardwood Panels*

CERTIFY ACKERMANN, JOHN WOOD, TENN. STOVE, SUNRAY, TOLEDO PORCELAIN, CLAROSTAT, PRECISION GRINDING

In line with accelerated activity for the National Safe Transit Program during 1954, the NST Committee has announced the certification of seven more companies.

The new certifications include: Ackermann Mfg. Co., Wheeling, W. Va.; John Wood Co.'s heater and tank division, Chicago, Ill.; Tennessee Stove Works, Chattanooga, Tenn.; Precision Grinding Wheel Co., Inc., Philadelphia, Pa.; The Sunray Stove Co., Delaware, Ohio; Clarostat Mfg. Co., Inc., Dover, N. H.; and The Toledo Porcelain Enamel Products Co., Toledo, Ohio.

The complete list of previously certified firms and laboratories was published in the Safe Transit section of April *finish*.

WIREBOUND BOX MFRS. SEE GOOD BUSINESS AHEAD

The wirebound shipping container industry set new high records in 1953 for both dollar volume of business and the number of containers it produced and sold.

The Wirebound Box Manufacturers Association's statistical review of the past year, which was presented at the WBMA annual meeting at Bellair, Florida, March 22-24, revealed that the industry's dollar volume for 1953 was $111,260,363 and its unit production was 186,367,262 wirebound boxes and crates.

NEIL A. FOWLER, ASSN. PRES.

The dollar volume was 3.3% over that of 1952, and the unit volume was 6.6% greater than the previous year.

A round table discussion of current business conditions and future prospects showed a decided optimism for business in March, April, and other months ahead, although there was a dip in sales for the first two months of this year.

The statistical review was presented by L. S. Beale, WBMA secretary.

Neil A. Fowler, vice president, General Box Co., Des Plaines, Ill., was elected president of the association to succeed J. A. Sowell, of T. R. Miller Co., Brewton, Ala., who served two terms. Sowell was elected vice president.

THE R-S TWO-WAY RIDE RECORDER

Weight: 17½ pounds
Case Dimensions: 8" x 15" x 8"

An Important Unit in the "Safe Transit" Program Used in the Laboratory and in the Field

Accuracy Certified by Independent Testing Laboratories

THE R-S Two-Way Ride Recorder meets all of the specifications adopted by the National Safe Transit Committee in the standard test procedure. Same sturdy design that has been used so successfully during the past twenty-eight years by both railroads and shippers. A simple and reliable instrument.

The following recorders are also available:

1. Savage Impact Register
2. Three-Way Ride Recorder
3. Two Component Accelerometer
4. Three Component Accelerometer
5. Small Accelerometer for Package Testing

All recorders available in following chart drives — in wide variation of chart speeds:

8 day Spring Driven Type	Synchronous Motors 60 cycle Type
16 day Spring Driven Type	Synchronous Motors 400 cycle Type
30 day Spring Driven Type	Impact Actuated Type

Participate in the "Safe Transit" program as many others are doing. Write for more information on how YOU can save money and protect your products in transit.

THE IMPACT REGISTER CO.
CHAMPAIGN, ILLINOIS

plans of the Wirebound Box Manufacturers Association cussed by some of the officers and new directors. Left to seated): L. S. Beale, secretary; J. A. Sowell, retiring nt and new vice president; and H. W. Norton, a new . Behind them, left to right, are two other new directors, D. K. Gooding and H. F. Blindman.

Directors elected include: S. J. Adkins, Adkins Mfg. Co., Gainesville, Fla.; H. F. Blindman, Flour City Box Mfg. Co., Waterloo, Iowa; J. C. Brill, Rathborne, Hair & Ridgway Box Co., Chicago; J. A. Cragwall, General Box Co., Des Plaines, Ill.; D. K. Gooding, Wisconsin Box Co., Wausau, Wis.; G. H. Kubes, American Box Co., Cleveland; F. J. Martin, Jr., Martin Bros. Box Co., Toledo; J. R. Miller, Jr., T. R. Miller Mill Co., Brewton, Ala.; H. W. Norton, Cummer-Graham Co., Paris, Texas; D. R. Simmons, Elberta Crate & Box Co., Bainbridge, Ga.; G. W. Thompson, Indianapolis Wirebound Box Co., Indianapolis; and A. L. Whiton, Chicago Mill and Lumber Co., Chicago.

ANNOUNCE FIBRE BOX COMPETITION AWARDS

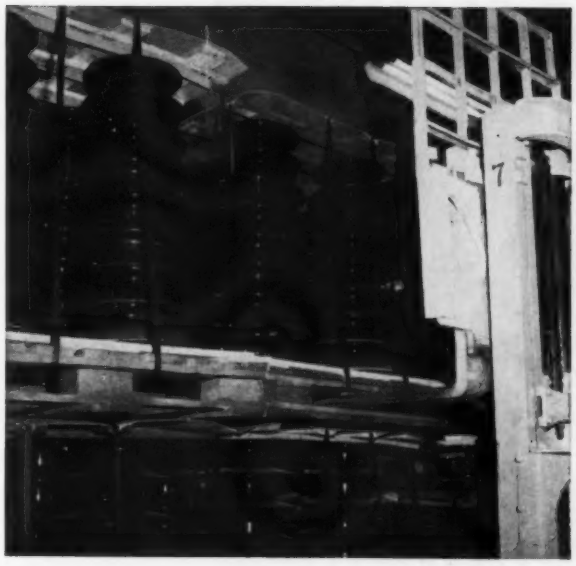
Seventy-one awards in 17 different classes of entries were presented April 13 to winners of the Fibre Box Competition sponsored by the Fibre Box Association.

The winners were announced by C. F. Smith, vice pres., Inland Container Corp., during the association's spring meeting held at the Edgewater Beach Hotel, Chicago. Smith was chairman of the competition and exhibit committee.

Winners in the class for appliance containers:

Small appliances — 1st, Inland Container Corp., for garbage disposal unit; 2nd, Stone Container Corp., waffle iron; honorable mentions: American Box Board Co., carpet sweeper; Hinde & Dauch Paper Co., light fixture; and International Paper Co., electric roaster.

Large appliances — 1st, Menasha Wooden Ware Corp., electric refrigerator; 2nd, Stone Container Corp., room air conditioner; honorable mentions: Kieckhefer Container Co. — The Eddy Paper Corp., television set; and Container Corp. of America, electric range.



SIGNODE UNITIZES INSULATORS

—Saves Shipper's Money

A manufacturer formerly shipped ceramic insulators in individual crates. This was costly, and new ways to pack and ship were sought.

On-the-job experiments and tests resulted in the perfection of a simple, unitized pallet pack for four insulators. Weights from one to one and one-half tons are handled on pallets of this type. Pallets were unitized securely with four bands of low-cost Signode steel strapping and seals.

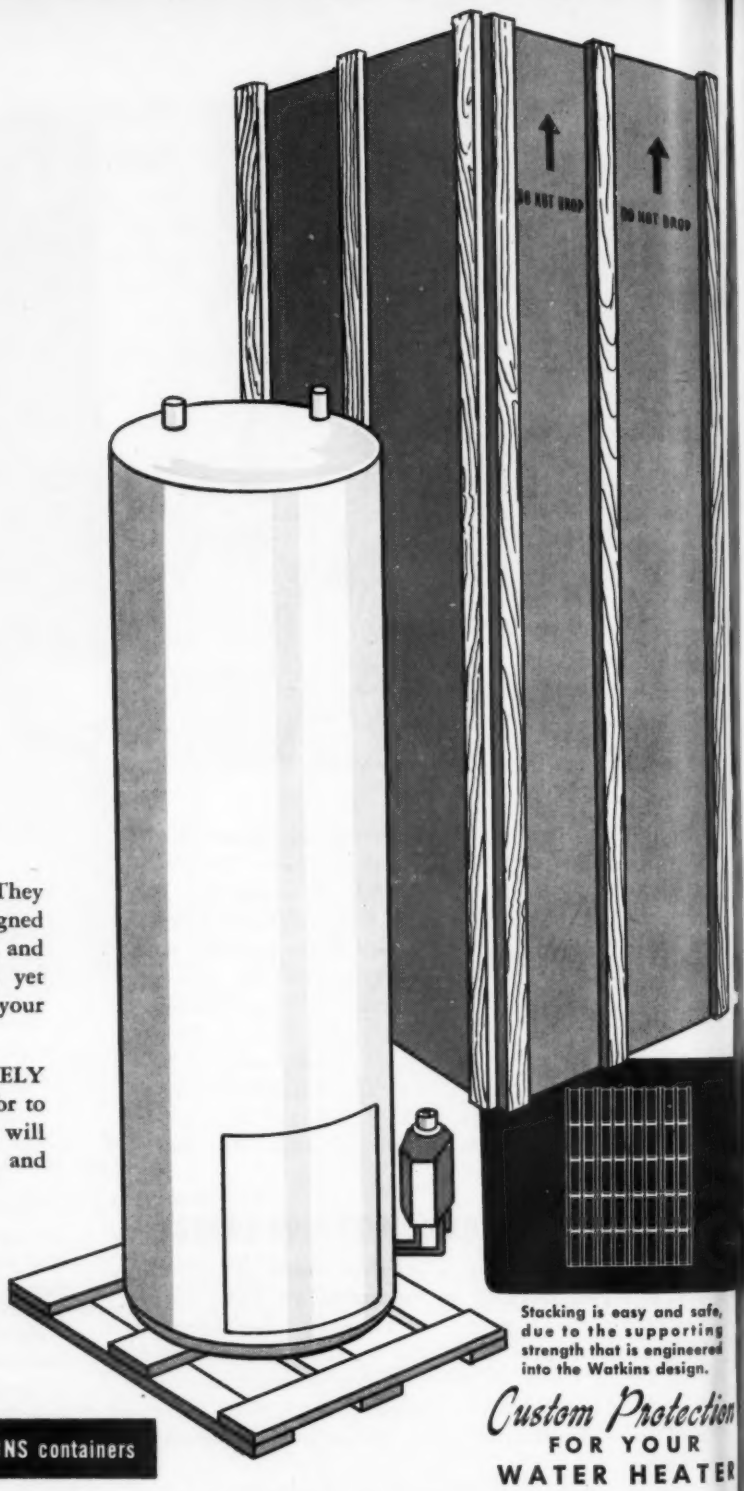
Elimination of the crates saved the cost of the crating lumber, much of the cost of packing and handling, permitted better use of man power, and lowered loss and damage claims.

Signode fieldmen have at their finger tips dozens of tested and approved unitizing methods for packing and shipping ceramic industry products. These include glass, ranges, washers, refrigerators, sanitary ware, floor and wall tile and electrical porcelains. Signode men will be glad to adapt known methods, or develop new ones, to help you cut packing and shipping costs. Write

SIGNODE
STEEL STRAPPING COMPANY
2639 N. Western Ave., Chicago 47, Ill.

THIS SEAL MEANS SIGNODE SECURITY IN SHIPPING

WATKINS has the container for your shipping problem



Stacking is easy and safe, due to the supporting strength that is engineered into the Watkins design.

Watkins Containers will cut your shipping costs. They are delivered to your factory 75% assembled and designed for quick and easy completion, to save you labor, time, and expense. Scientific design gives maximum strength, yet keeps container weight at a minimum and reduces your shipping costs.

In a Watkins Container your product is COMPLETELY protected enclosed 100% by a smooth, staple-free interior to safeguard fine finishes and to keep out dust and dirt. It will carry safely, you can stack to any practical height, and resistance to "weaving" and shock is assured.

Only Watkins Containers provide all of these many desirable and necessary features and at no greater cost than other types of containers. Ship your carefully manufactured products safely and economically—ship them the "Watkins Way."

Custom Protection FOR YOUR WATER HEATER

these companies build WATKINS containers

Cornell Paperboard Products Co. ..... 1514 E. Thomas Ave., Milwaukee, Wis.
Cozier Container Corp. ..... 446 East 131st Street, Cleveland, Ohio
Crate-Rite Mfg. Corp., Division of Pacific Ports Ind. Inc. ..... 10901 Russett Street, Oakland, California
Dura-Crates, Inc. ..... 940 East Michigan Street, Indianapolis, Indiana
General Box Co. ..... 1825 Miner St., Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky
Hemb & Martin Mfg. Co. ..... Watseka, Illinois
Illinois Box & Crate Co. ..... 811 Center Street, Plainfield, Illinois
Kieckhefer Box & Lumber Co. ..... 1715 West Canal Street, Milwaukee
Lane Container Corp. ..... 10212 Denton Road, Dallas
Lewisburg Container Co. ..... 243 Singer Street, Lewisburg
Livingston Wood Manufacturing, Ltd. ..... Tillsonburg, Ontario
Love Mfg., Inc. ..... 608 South Commerce Street, Wichita
Pennsylvania Box & Lumber Co. ..... 2331 N. Bodine St., Philadelphia
Utility Crate Corporation ..... 1985 E. 16th Street, Los Angeles 21,

—an inquiry to any of these companies will get prompt attention

The · WATKINS CONTAINER · Manufacturer

FERROD JOINS NEMA

Ferrod Manufacturing Co., Batavia, Ill., has joined the National Electrical Manufacturers Association, and is affiliated with the Industrial Heating Units and Devices Section.

H. F. Bond is executive vice president of Ferrod, a subsidiary of Ferro Corp., and E. G. Weissenberger is sales manager.

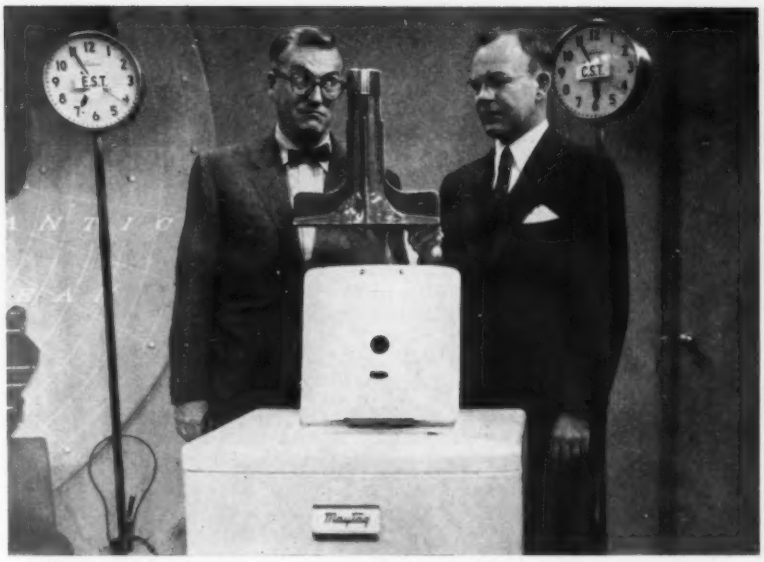
MANWARING HEADS NEMA WATER HEATER SECTION

At a recent meeting of the Electric Water Heater Section of the Major Appliance Division, National Electrical Manufacturers Association, A. H. Manwaring, executive vice president of Philadelphia Electrical & Manufacturing Co., was elected chairman.

DESIGNER MACALISTER VOTES FOR COLOR

The current upswing in the use of color in the kitchen reflects a radical transformation which is making the kitchen "a living space rather than strictly a functional food factory," says Paul R. MacAlister, color and design consultant, Chicago. He said that "cool, clear tones", with a few accents of bold warm colors, can be varied to suit any kitchen plan.

Manufacturers of products for the kitchen recognize that present-day living patterns call for new applications of color. For example, stated MacAlister, every refrigerator and even some home freezers in the current line of Deepfreeze home appliances have all-color interiors of a cool but rich green, with dashes of contrasting colors inside and out.



Dave Garroway — *whose daily show "Today" is viewed on the NBC network — discusses a new feature of the Maytag washer with Fred Maytag, president, Maytag Co. The two men are holding a plastic agitator which contains an automatic water level control unit in the cap. Maytag appeared on the initial show sponsored by his company.*

On the 25th anniversary — *of the Hotpoint Engineering Society — J. C. Sharp, president of Hotpoint Co., extends his congratulations to L. R. Sheeley, president of the society. Ten of the original 21 founders were present for the occasion. They are (left to right) J. R. Fritze, W. J. Ettinger, F. E. Kirk, D. H. Simpson, J. C. Sharp, L. R. Sheeley, R. J. Sutton, L. F. Berg, E. L. Patten, M. F. Nagel, M. Michaelis and W. L. Boetchius. Monthly meetings of the society are devoted to education and self-improvement through an inter-exchange of ideas.*

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Customer Service 360 N. MICHIGAN AVE., CHICAGO 1, ILLINOIS

"I saw your ad in finish"

Westinghouse history

→ *from Page 23*

a plant in Columbus, devoted to refrigeration products. The first refrigerator produced in November, 1953, marked the debut of the largest plant ever built by Westinghouse.

The vast plant, situated on a 315-acre site, contains approximately 2,000,000 sq. ft. of floor space and at top capacity can produce 4,000 major appliances a day. Its roof covers 45 acres of plant area. The plant contains four manufacturing aisles, each 200 feet wide and extending nearly 1500 feet. These aisles lead in a straight line production pattern to the warehouse area which has a storage capacity of 100,000 major household appliances.

In January, 1954, the Division began a $7,000,000 expansion program to rearrange and expand the plants in Mansfield and East Springfield. This program is designed to approximately double production of several major appliances and substantially increase production of portable appliances and refrigeration specialties products.

TOWNSEND TO AVCO

Appointment of Russell S. Townsend as manager of research and advanced development for appliances was announced by O. E. Norberg, director of appliance engineering, Appliance and Electronics Division of Avco Mfg. Corp., Cincinnati. He formerly was with Admiral Corp.

CLASSIFIED ADVERTISING

EQUIPMENT WANTED

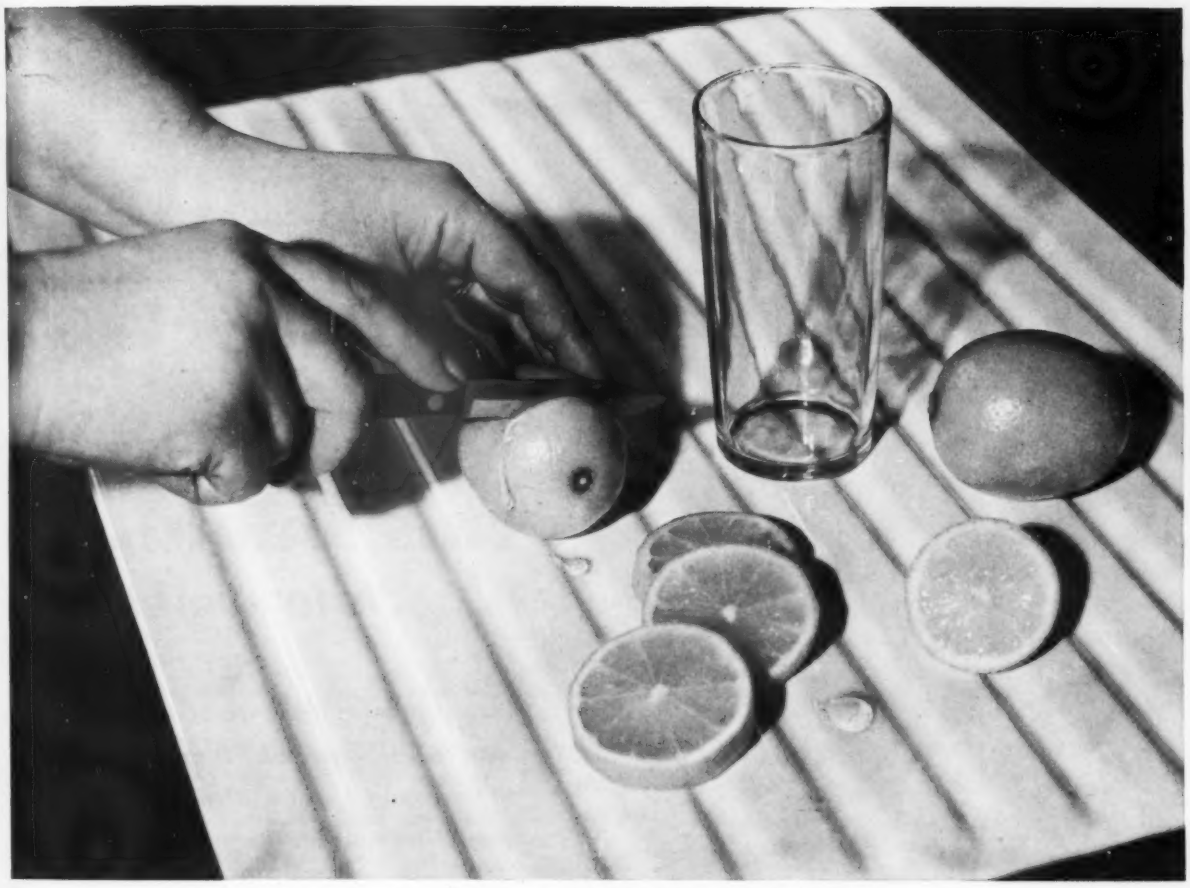
Wanted to buy complete tooling outfit for the manufacture of washing machines; presses and dies for sinks and lavatories.

COMISIONISTAS DE MONTERREY, S.A.
Apartado Postal #909
Monterrey, N.L., Mexico

POSITION OPEN

Young man with ceramic background for junior salesman training. Please state experience and salary requirements.

Address reply to Box 554, c/o *finish*, 360 N. Michigan Ave., Chicago 1, Ill.



The finish that acids don't stain helps sales

When buyers hold back and it's tough to make sales, you can get a real edge on competition by putting extra sales effort behind products that have acid-resisting porcelain enamel finishes.

This durable finish is not damaged by fruit juices, alcohol or commonly used chemicals which tend to permanently mark or destroy many other kinds of finishes.

A porcelain enameled finish gives your products many other advantages too. It is called the "lifetime finish" because it is made of hard, rock-like minerals that are not affected by time or rust. After years of service it looks just as good as the day it was fused to the base metal.

WITHSTANDS HEAT

Porcelain enamel is easy to clean and keep clean. Soap and water will usually remove all traces of stain and dirt. Even hot irons or forgotten cigarettes won't damage porcelain enamel. Its hard glossy surface withstands any temperature it is likely to encounter in home service.

You can finish your products with porcelain enamel in any color, in any variations of shades, and in textured or plain surfaces. And you can be sure the color won't "fade out."

Of course, the metal beneath the Porcelain Enamel surface must have excellent bonding qualities, flatness, and uniform fabricating characteristics. That is why more manufacturers have used more Armco Enameling Iron over a longer period than any other enameling base. That is why too it has become known as the "World's Standard Enameling Iron."

ARMCO STEEL CORPORATION

4363 Curtis Street, Middletown, Ohio

Export: The Armco International Corporation

ARMCO

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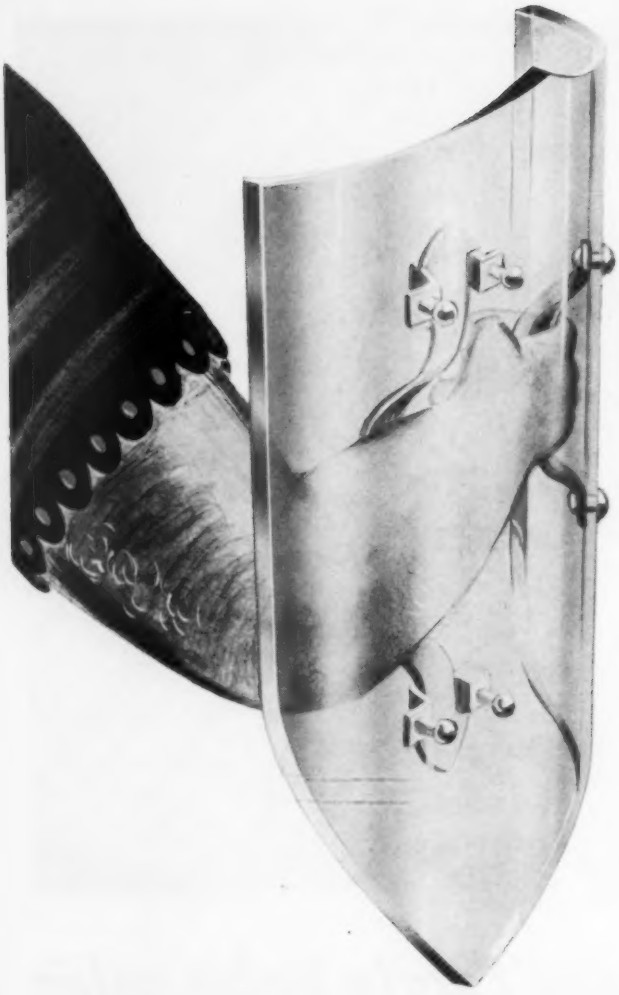

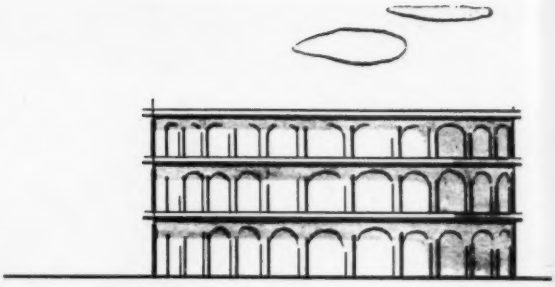

this shield,
while symbolic,

represents some of the things a master craftsman can do with glass. It can be bowed to fit any desired shape, it can be drilled and shaped to exact tolerances.

It can be tempered to impart extreme resistance to impact — that is why safety regulations demand glass as a safety barrier when danger exists.

Let Marsco's craftsmen-engineering team impart to your product all the advantages of glass

Let glass improve the utility of your product while it beautifies it.

Marsco

MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.

June • 1954

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MONTHLY TRADE PUBLICATION
Established January 1944
Published by
DANA CHASE PUBLICATIONS
360 North Michigan Avenue
Chicago 1
Telephone CEntral 6-1229

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. Includes technical and practical information on plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on fabrication, metal preparation, metal finishing, assembly, and packaging and shipping.

Free controlled circulation to management, purchasing, engineering and key plant personnel in metal product manufacturing plants. To others, subscription price is $5.00 per year, domestic. To all other countries $8.00 per year (U.S. funds).

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METAL PRODUCTS MANUFACTURING
FROM RAW METAL TO FINISHED PRODUCT

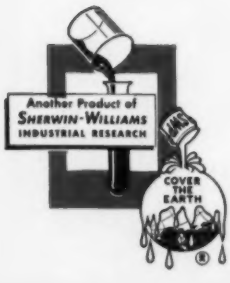
REDUCES with WATER...

reduces spray and dip tank fire hazards!

No longer do open dip tanks . . . exposed paint-spraying operations . . . need to mean dangerous fire hazards. Many or most industrial enamel requirements now can be met with new Sherwin-Williams Emulsion-type Enamels which use only WATER as a reducing agent in place of flammable solvents.

Fire hazards during paint application are reduced or eliminated. Sherwin-Williams Water-Reducible Enamel will not burn either in spray or liquid form, at normal temperatures, even if exposed to open flame. Cured film is not water soluble—provides a very hard gloss finish with properties equal to conventional finishes. Available in black or colors.

Find out today what this new product of industrial research can offer you. Call, wire or write The Sherwin-Williams Company, General Industrial Division, Cleveland 1, Ohio.



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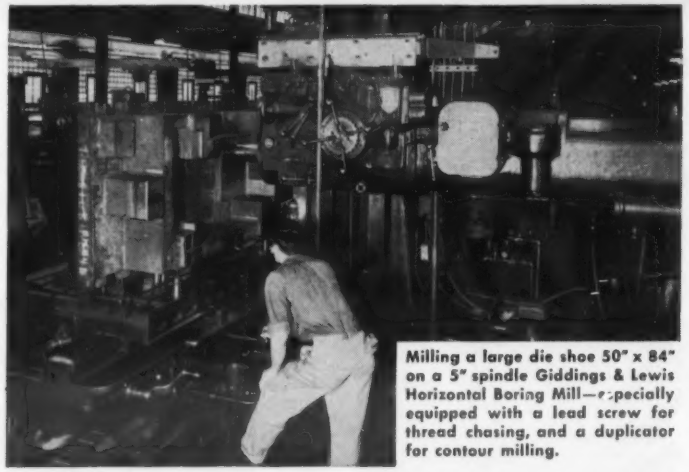
EFFICIENT Tooling

YOUR KEY TO

- simplified manufacturing operations
- increased stamping production
- lower costs—higher quality



Milling a large die shoe 50" x 84" on a 5" spindle Giddings & Lewis Horizontal Boring Mill—especially equipped with a lead screw for thread chasing, and a duplicator for contour milling.

Shown above—the assembly of various tools for the production of refrigerator and other parts.

EFFICIENT designs and builds
Dies, Tools, Jigs, Fixtures, Special Machines

Here's experience, skill and tooling know-how you can depend on. If you have "tough" stamping problems let us suggest an ingenious solution. Whether your tooling requirements are large, small, simple or complex, we can build dies that will save you time, trouble and expense in your production.

The EFFICIENT organization has the men, machines and large modern plant to serve you well. Our complete equipment includes tryout presses up to 300 tons capacity. Sample parts are delivered for your approval before dies are shipped.

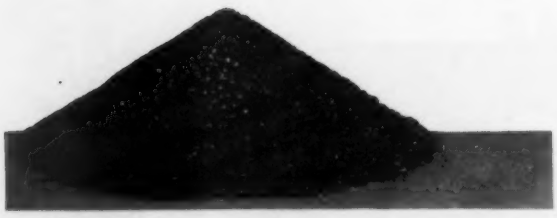
EFFICIENT engineers will be glad to consult with you, work with you, or furnish quotations. Write or phone for complete information.

THE EFFICIENT TOOL & DIE COMPANY

9314 ELIZABETH AVENUE · CLEVELAND 5, OHIO · PHONE Diamond 1-5150

Try Century Vit

GROUND COAT



"Start right from the Steel out" is more than a slogan — it represents a policy and belief at Century that without an easy-working, trouble-free ground coat with good adherence or "Grip" no finish can give trouble-free service for the life of the product.

The millions of pounds of Century ground coat frit that are used every year by our customers give extra assurance of trouble-free finishes, both in the shop and on the finished product.

Century *time-proved* frits "put dollars in your pockets" too. They are priced right to start and there are "in plant" savings that count up fast.

If you haven't tried this economical, trouble-free enamel, contact us and we'll see that you have the opportunity.

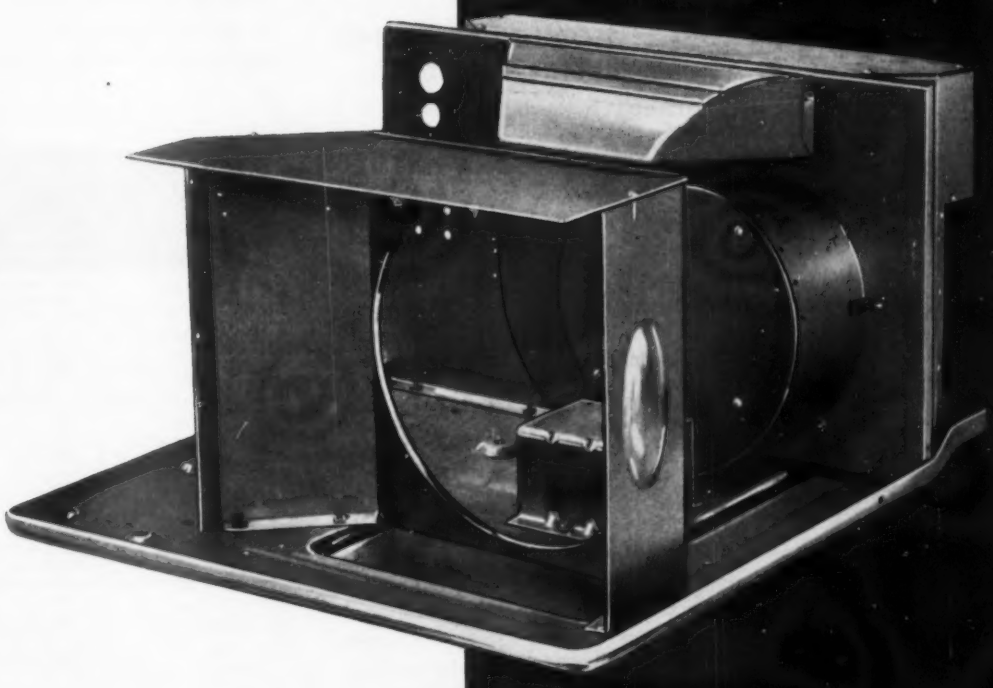
An experienced field staff serves the plants of all Century customers. Phone POrtsmouth 7-7260.

FRIT from CENTURY FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY

• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •

for
Stampings
Fabrication
and
Spot Welding
see
DANIELSON



These front and back views of mock-up show typical parts of the famous Fresh'nd-Aire room conditioner manufactured by Cory Corp. Each unit has approximately twenty-four parts made by Danielson for the Cory Corp.

Whether you need a single stamping or a complete assembly, let us show how we can fit into your production schedule, *to your advantage!*

Write — 'phone — or wire us today!

V. W. DANIELSON
MANUFACTURING COMPANY
3360 W. HOPKINS ST. • MILWAUKEE 16, WISCONSIN • Phone CUSTER 3-3800

SAVE
Time and Money
with DANIELSON

NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

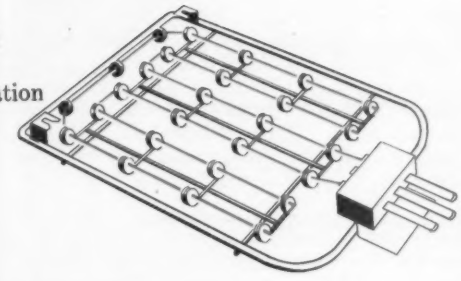
AMERICAN CHEMICAL PAINT COMPANY

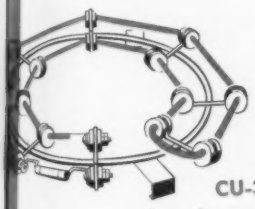
General Offices: Ambler, Penna.

Detroit, Michigan **Niles, California** **Windsor, Ontario**

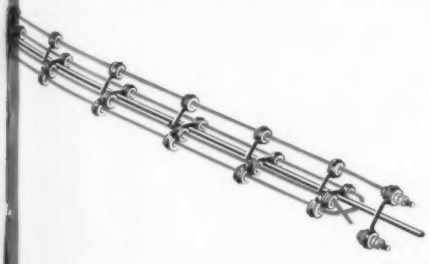
E R S A T I L I T Y !

CU-282
etric
application

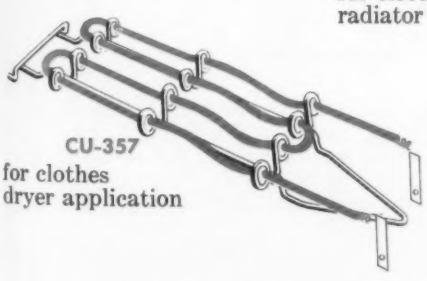




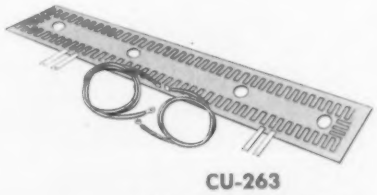
CU-360
for air conditioner
application



CU-335
for electric
radiator application



CU-357
for clothes
dryer application



CU-263
mica clad for electric
ironer application

The Tuttle Twins help to *create new standards*—not just meet them.

Regardless of application or design, "NYKELKROM" quality heating elements meet all requirements.

H. W. Tuttle & Co.

ADRIAN, MICHIGAN

Nykelkrom
FOR QUALITY

[Advertisement]

IF YOU USE SET-UP WHEELS . . .

here are facts to prove you can save from $301 to $2184 *each* year at *each* set-up wheel station.

First, let's examine the upkeep costs of set-up wheels (rag wheels). In a survey just completed, set-up wheel users reported the cost of recoating these wheels to be from 12c to 32c each. These figures were for labor and material only. The survey also showed that one operator uses from 6 to 40 wheels every day.

Thus, taking an average recoating figure of 22c — a conservative figure of one operator using 10 wheels a day — and a 250-day production year . . . the yearly upkeep cost of set-up wheels for one operator amounts to $550.

To this cost must be added the replacement cost of worn out wheels. The survey showed that one operator will wear out a minimum of 60 set-up wheels in one year. At a replacement cost of $3, this adds another $180 to the total.

The total is now $730 — the cost per operator per year using set-up wheels.

There is another answer. Numerous on-the-job tests have proved that Nu-Matic Aircore Air-Inflated Grinding Wheels will handle the same production work assigned to set-up wheels — and will produce results that are somewhat superior.

How do Nu-Matic Wheels compare with set-up wheels on costs? When a Nu-Matic Grinder is used, the upkeep costs stem from the replacement of worn coated abrasive bands. A recent cost study made by one of the largest appliance manufacturers shows that they get three times more work finished with one abrasive band on a Nu-Matic Grinder as they used to from a similarly sized set-up wheel.

Thus, if an operation requires 10 set-up wheels a day, the same job will wear out approximately 3 abrasive bands each day — a total of 750 bands in one year. Figuring 60-grit glue bonded abrasive bands for a 5" x 2½" Nu-Matic Grinder, band cost varies between 17.3c and 24c depending on quantity purchased. Using an inbetween price of 21c, the yearly bill for abrasives would amount to $157.50.

There is one replacement item on a Nu-Matic Grinder — the contact drum. Two drums a month per operator is a high figure. This adds another $96 to the yearly upkeep costs. Adding these figures together we get a total of $253.50 — the upkeep cost per operator per year when a Nu-Matic Grinder is used.

What's the payoff? A yearly saving of $476.50 for each operator. One of our customers has 150 set-up wheel operators. We can save him $71,475.00 each year in *direct* costs alone. This represents a potential increase in net profits before taxes. Add to this the savings realized by the elimination of the overhead necessary to operate a set-up wheel recoating department.

If your direct cost for recoating each set-up wheel is greater than 15c (we have assumed 22c), then a searching examination of your set-up wheel operation is in order. Begin that examination with a set-up wheel vs. Nu-Matic Grinder cost comparison AT OUR EXPENSE. We will ship you a Nu-Matic Aircore Air-Inflated Grinder for a 25-day free trial period. Just send us a letter outlining the job requirements and the size set-up wheels you are using now. We'll do the rest.

Here's a tabulation of the above figures:

COMPARATIVE COSTS — SET-UP WHEELS VS. NU-MATIC GRINDERS

1 operator for 1 year = 250 working days

Set-Up Wheels	
Recoating wheels (10 a day) 2500 @ 22c	$550.00
Replacing worn out wheels 60 @ $3	180.00
	$730.00
Nu-Matic Grinders	
Abrasive bands (3 a day) 750 @ 21c	$157.50
Replacing contact drums (2 a month) 24 @ $4	96.00
	$253.50
SAVINGS (each operator — each year)	$476.50

As mentioned, the figures used in the above analysis are conservative. Actual savings will vary with YOUR recoating costs and the number of wheels YOU use each day. Here's a chart that shows possible savings when NuMatic Grinders are used instead of set-up wheels.

If daily number of set-up wheels used by one operator is:

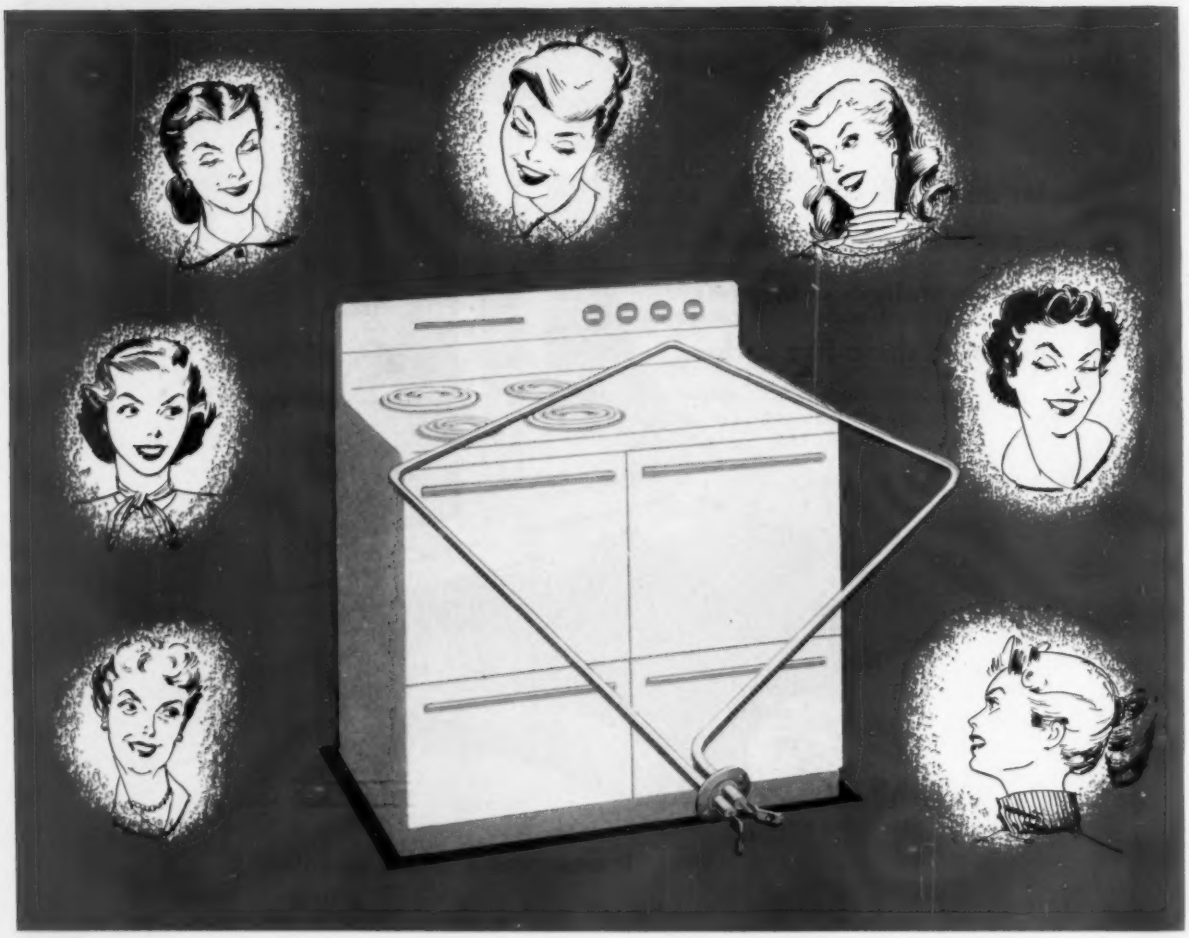
If recoating cost per set-up wheel is:	10	20	30
15c	$301	$464	$684
20c	426	714	1059
25c	551	964	1434
30c	676	1214	1809
35c	801	1464	2184

These will be the yearly savings per operator using Nu-Matic Grinders.

NU-MATIC GRINDERS, INC.

8224-A Carnegie Ave. Cleveland 3, Ohio

A fine, smooth
porcelain enamel finish
never dulls, nor loses its
gleaming china-like surface.
It deserves a good enameling
base* and a sheet surface texture
prepared to assure maximum
adhesion of the coating.
PORCELAIN ENAMEL ON
USS Vitrenamel*
BASE
USS
UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
UNITED STATES STEEL



So simple! So safe! So appealing to women!

TK® Rod-type Oven Units

If you know *women* at all, you know these two things to be true: First, it is women who *buy electric ranges.* Second, women *like things simple* (both to use and to clean).

TK Rod-type Oven Units are built for women, to give them the ultimate in simplicity, safety and convenience. They also have been developed with *you,* the electric range manufacturer, in mind. In most cases they will save you money, because you can eliminate receptacles and baffles in your oven design.

Hinged at one corner, these units are easily swung up and away from the oven base for quick, easy cleaning. They also are available with bayonet-type connections for standard installation. Either type, *with or without baffles,* will do a superb cooking job.

Still another feature you will want to stress is the long life of these units. Their sealed, rod-type construction makes them immune to spilled foods, rust and corrosion. And they are completely safe—as easy to handle as a light bulb.

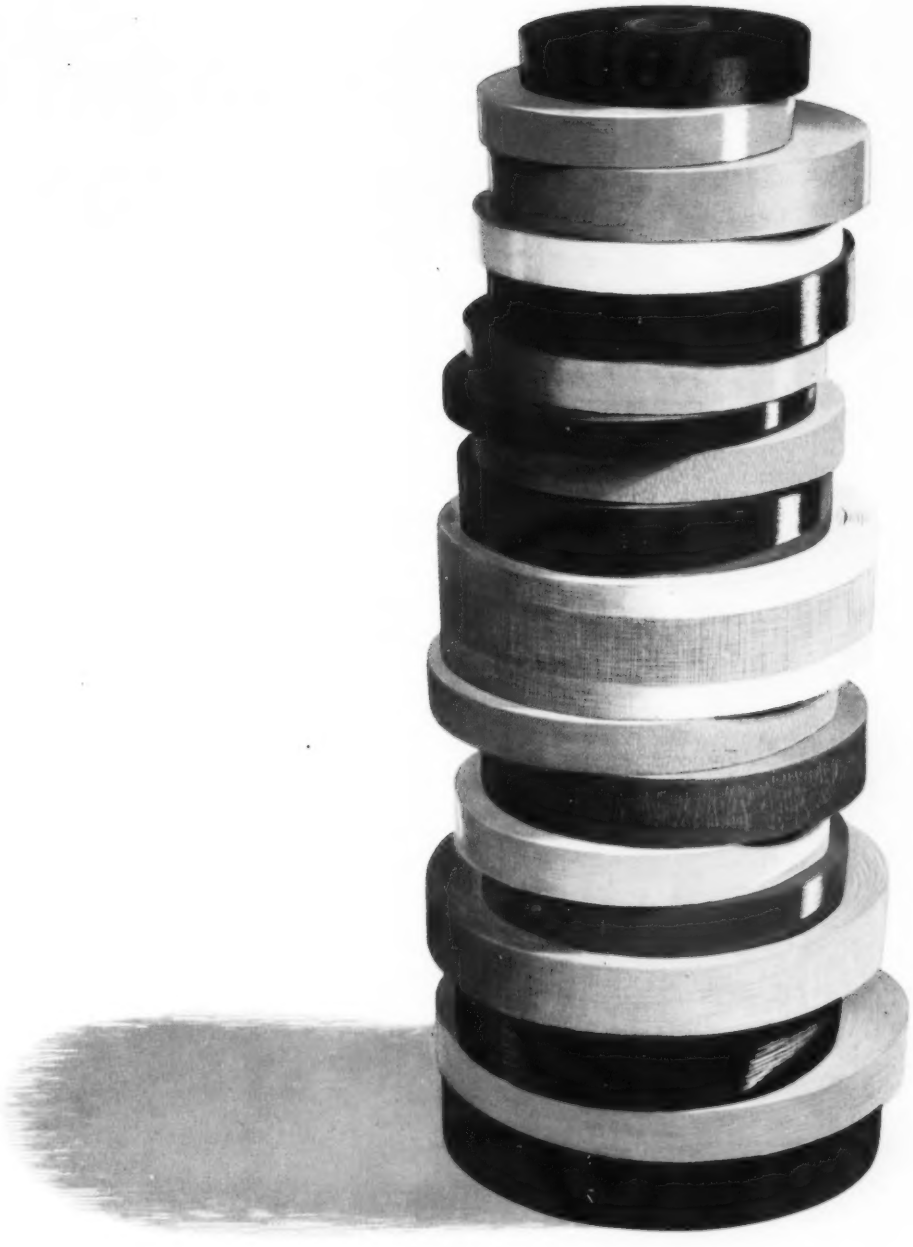
Yes, there are a lot of things to recommend TK Rod-type Oven Units to you . . . and to the women who ultimately buy your electric ranges. Why not plan now to put them in your new range models? We'll be happy to furnish samples, also give you any technical help you may need.

TK FERRO

FERROD MFG. COMPANY

A Subsidiary of Ferro Corporation

609 N. RIVER ST. • BATAVIA, ILL. • PHONE 6240

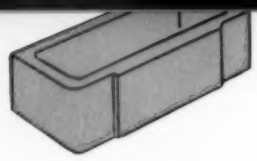


whatever the job . . .

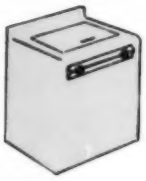
SELF-STICKING

PERMACEL® TAPES

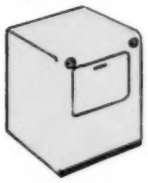
In our complete line, there's a self-sticking tape for every job . . . write Permacel Tape Corporation, New Brunswick, N. J.



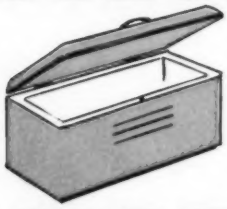
NOW Chicago Vit OFFERS YOU



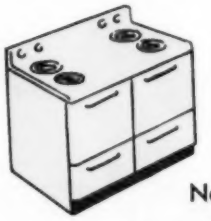
new sales appeal for your products



with SINGLE COLOR TINT-TANIUM



or with COLOR ADDED IN YOUR MILL



No matter which system you choose you can be sure that Chicago Vit materials will give you the most uniformly stable results day after day . . . week after week. For more sales building information on colors for your products, contact your Chicago Vit representative or write to

Chicago Vit

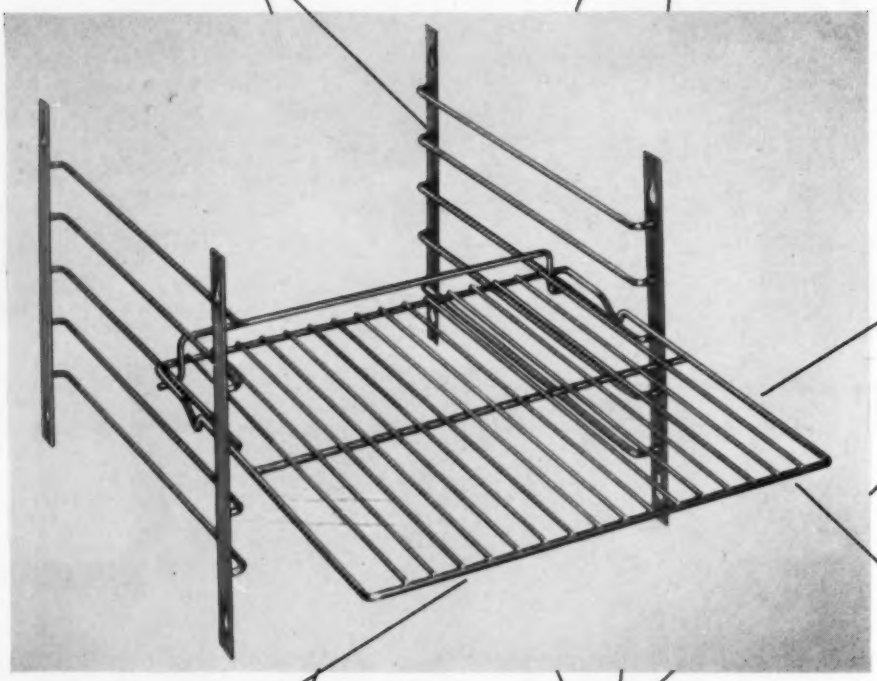
REOUS ENAMEL PRODUCT

1407-47 South 55th Court • Cicero 50, Illinois

THE finish spotlight

"Doubling in brass", this Perfection electric water heater not only supplies the hot water needs of an average-size family, but its table-top design also provides extra work surface. So well insulated is this 40-gallon heater that flowers or plants, placed on top for a decorative touch, will not wilt.

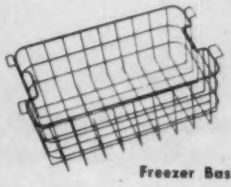
RANGE MANUFACTURERS!



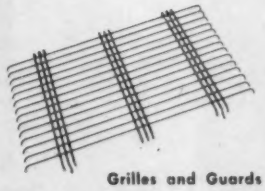
UNIFLOW features

Tip Proof — Slip Proof Safety Shelves
Shelves Have Own Stops and Supports
Easier to Remove, Clean and Rearrange
Bright Nickel or Copper-Nickel-Chrome Finishes are Available
Slide Frames afford Better Heat Circulation and Distribution
Slide Frames "snap-on" or Off for Quick, Easy Cleaning
Slide Frames Compensate for Expansion, Contraction
Can Be adapted, More Economically, to Any Oven

THE DIFFERENCE IS *Quality!*



Freezer Baskets



Grilles and Guards

your range SELLS FASTER when equipped with...

UNIFLOW
SHELVING and SLIDE ASSEMBLIES

It's a fact...you can sell more ranges...quicker...easier ...by simply demonstrating the many practical advantages of Uniflow shelving and slide assemblies.

Union Steel's Uniflow oven shelving and "snap-on" slide assemblies have those practical features that sell themselves . . . and, help sell your range. They make your shelving space a selling space!

Smooth, clean and attractive, Uniflow oven shelves are flawless. They cannot tip, slip or sag. Yet, they are easily removed for cleaning or change of position. Then too, USP's pre-engineered "snap-on" slide frames offer greater design versatility, compensate for expansion, afford better heat circulation than pressed or embossed liners. And . . . they're more economical.

• Uniflow shelves and slide frames are preferred by the consumer for their stability, convenience and usefulness factors. A Uniflow equipped range sells faster!

FREE booklet

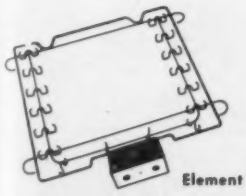
Yours for the asking . . . a big, four-page illustrated folder gives you the complete "inside" story on how USP Uniflow shelving is made and why it is better suited to your needs.

In the conventional modern range, Uniflow Shelving and Slide assemblies have proved their economies, safety and usefulness factors. Their gleaming beauty and versatility have made them the standard of the Industry.

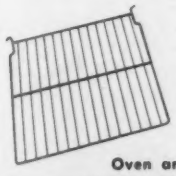
In the ultra-modern wall type oven, Uniflow shelving and slide assemblies are at their best. Matched to the design standards of the day, their efficiencies and economies appeal to both the manufacturer and the consumer alike.

● UNION STEEL PRODUCTS CO.

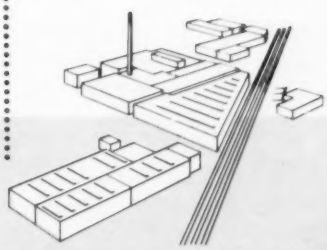
Wire Products Division • **ALBION, MICHIGAN**



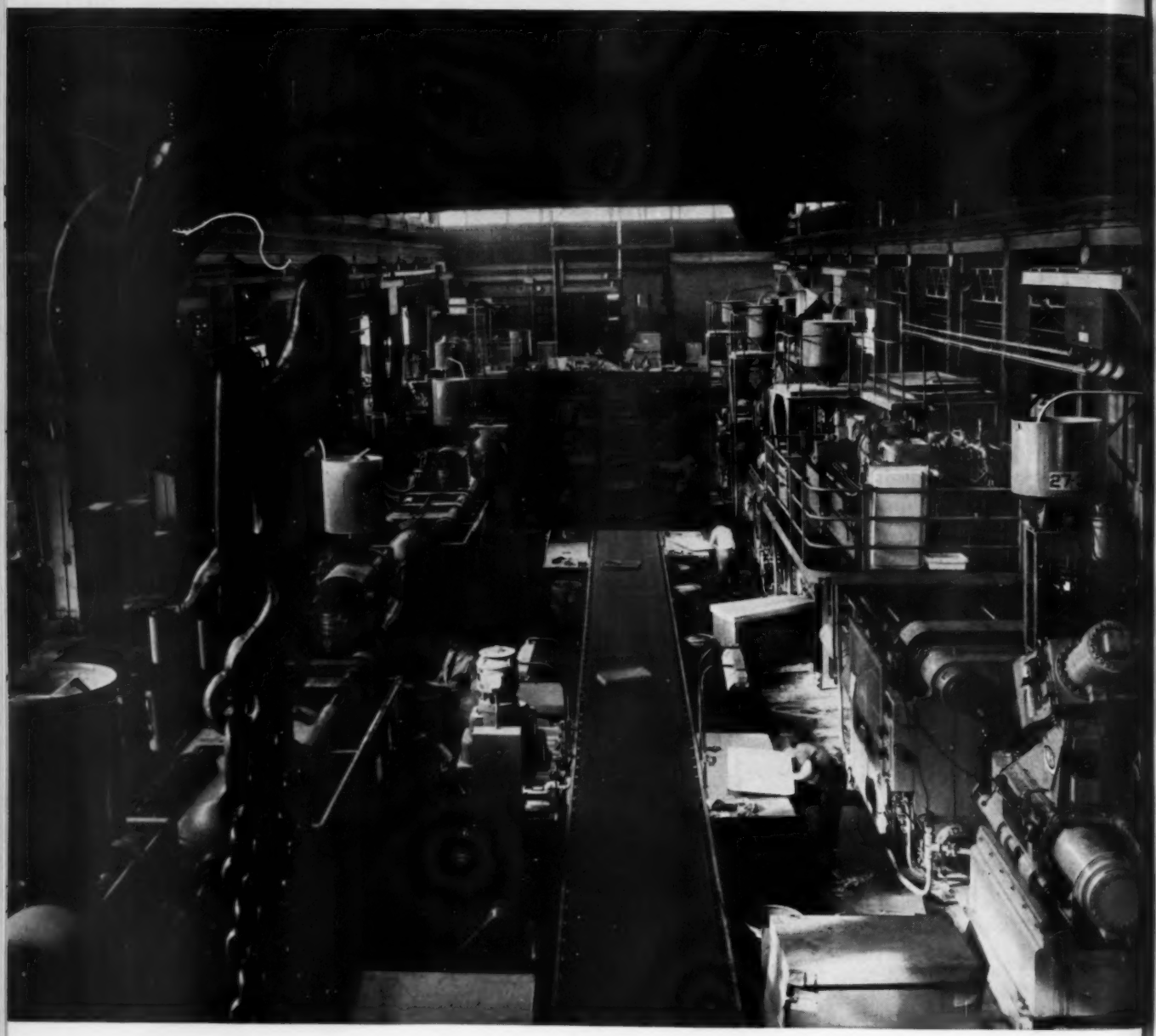
Element Frames



Oven and Refrigerator Shelving



385,000 square feet of plant devoted to contract welded wire fabrication.



new ideas come to life in plastics molded by General American

How many of your good ideas have died on a scratch pad? . . . simply because production wasn't practical.

At General American, manufacturers in many industries have seen their new ideas come to life in plastics. Here on the biggest, most versatile plastics production line anywhere, intricate shapes are molded in one "shot". For many products, volume production in plastics becomes a reality for the first time. Tremendous strength is coupled with light weight. Utility and durability team up with colorful new sales appeal never before possible.

For example, this conveyor belt, serving a double battery of injection presses in one of General American's plants, carries some of the world's largest, most intricate and unusual plastics moldings.

Here—yours to use . . . everything you need from development to delivery. Talk over your ideas *now* with a General American engineer.

PLASTICS DIVISION

GENERAL AMERICAN TRANSPORTATION CORPORATION 135 South La Salle Street, Chicago 90, Illinois

● Facilities unmatched anywhere: injection presses to 300 ounces, compression presses to 2,000 tons, reinforced plastics molding, die making, painting, assembly, packaging

Designed for timid souls who shy away from complicated controls—

NEW LUX "OVEN-MINDER"

We're telling the "Oven-Minder" story to the millions of readers of: *Better Homes & Gardens, Ladies' Home Journal, Today's Woman, Living for Young Homemakers, House Beautiful* and *Good Housekeeping.*

Simplest ever developed for Automatic Cooking!

HOW LONG

Nothing new to learn! Nothing new to do! All she does is set the Minute Minder for the cooking time required and the temperature for the heat required. Her dinner is now cooking and will turn off *automatically!*

HOW HOT

If she wants her cooking to start later, all she does is turn this knob to the starting time—just as simple as setting an alarm clock!

DELAYED START

When time's up, she's reminded with the exclusive

LUX BELL-CHIME SIGNAL

And, what's more, the Minute Minder can be used for timing a hundred other household chores!

No wonder range-makers are adding new sales appeal to their lines with the exclusive LUX "Oven-Minder."

Write Lux today for complete details!

THE LUX CLOCK MANUFACTURING COMPANY • WATERBURY 20, CONNECTICUT

Two heavy press lines of five presses each comprise the primary stamping and drawing equipment. Line at right forms kitchen sinks, automotive stampings, etc. Presses at left form, flange and trim bathtubs.

Bathtub, sink, cabinet production at Kaiser Metal Products

AT its highly mechanized plant in Bristol, Pa., the commercial division of Kaiser Metal Products, Inc. produces products for the home along with aircraft and automotive components.

Major production of domestic products is concerned with the fabrication and finishing of bathtubs, sinks and kitchen cabinets — which are sold to various merchandising outlets.

Fabrication

The major metal forming units, located in Plant 1, are two lines of five presses each, which completely form and trim bathtubs and sinks. Press capacities range up to 1800 tons. Maximum production per eight-hour shift is 1500 bathtubs, 2000 single-bowl sinks or 1500 double sinks.

Bathtubs are drawn to a depth of 14½" in one stroke of the first press of one heavy press line. This is done on a double-action press whose outer ram, exerting a pressure of 800 tons, firmly holds the sheet steel blank in place on the press bed. Then the inner ram bearing a die shaped to the contour of the tub, draws the tub under a pressure of 1000 tons.

Batteries of light presses are used for production of kitchen cabinets, doors, hinge units and other small parts. When cabinet doors, drawer fronts, etc., are formed, there remains an "ear" of steel which must be removed. These are trimmed in a new high-speed trimmer, and on two "hydro-trim" presses which are built to KMP specifications for this job.

Small hardware items are formed from strip steel in coil-fed presses. About 125 tons of steel are processed daily through these machines. KMP buys considerable steel in wide coils which are slit to narrower widths on a new slitter recently installed in the plant.

Synthetic finishing

A modern synthetic enameling system, including phosphatizing equipment, handles the finishing of kitchen cabinets in Plant 1. Two complete

individual finishing lines include prime and finish coat spray booths and ovens. Conveyors carry finished cabinets from Plant 1 to the packing area in Plant 2 which also houses the enameling operations for bathtubs and sinks.

Two miles of overhead conveyor

Plants 1 and 2 together contain 12,000 feet — more than two miles — of monorail overhead conveyor. The two plants are connected by overhead conveyors traveling through covered bridges across the street separating the two facilities. In addition to transporting parts from one operation to the next, the conveyor system serves as a convenient facility on which parts can be stored until ready for assembly or finishing.

Vitreous enameling

The vitreous enameling plant contains two electrically-heated, hump-type, continuous furnaces as follows: (1) a ground coat furnace with 54-foot firing chamber and 8 temperature control stations, and (2) a white, or colored, coat furnace with an 80-foot firing chamber and 14 temperature control stations. Ground coats are fired at 1570° F., and finish coats from 1420-1525° F.

The 14 temperature zones in the finish coat furnace make it extremely versatile. Temperature in each zone can be maintained at any degree up to 1500. Each zone is independently regulated, permitting wide variance in floor to ceiling as well as linear temperature controls. When installed in August, 1949, the finish coat furnace was the largest electric enameling furnace ever built.

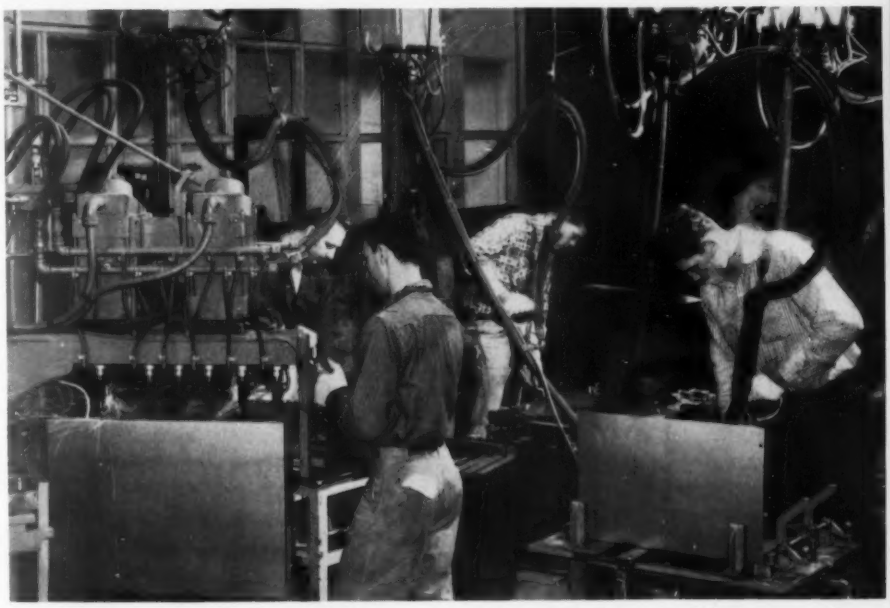
The facilities of this plant are capable of producing up to 100,000 square feet of finished enamelware per three-shift day. This is equal to approximately 4200 sinks or 2100 bathtubs per day.

Chemical and physical laboratory and process control equipment includes: spectrophotometers, electrophotometers, magnagauges, slump tester, magnetic thickness testers, plus a fully-equipped pilot plant.

An automatic graining machine has

to Page 60 →

Preparation of steel sinks for porcelain enameling includes grinding to eliminate imperfections and to provide a proper surface for the finish.



Kitchen cabinets are assembled by spot welding. Workman in left foreground operates a multiple unit which welds at six points simultaneously. Other men are operating "poke" welders.

Steel bathtubs fresh from spray booth are given last check before entering enameling furnace. Inspector wields spray gun for touch-up work and a duster to remove foreign particles which might mar the finish.

Would you mount a Fine Diamond in a Brass Ring?...

Silly? Yes, but could be you are doing just that...

It has been said that you can sell dirt in a pretty package. Well . . . if that's true, then it's a cinch that the package must be quite important . . . and . . . it must follow that *a good product in a good package* will sell well and STAY sold.

Is your package worthy of your product?

Your "Package" is the porcelain enamel on your product. Is that package worthy of your product? It can't be unless the Frit from which you produce your enameling is "RIGHT."

ING-RICH Frits are producing superior "Packages" for some very successful concerns

There's a mighty good, sound reason why Ing-Rich Frits do produce these superior "packages." Remember that Ing-Rich not only produces superior Frits but also operates one of the largest job enameling plants in the country. That means you get PLANT Tested Frits . . . Frits that have to be "Right" or else we would not have been so successful thru these many years in holding our job-enameling customers.

ING-RICH
FRIT
"The Plant Tested Frit"

INGRAM-RICHARDSON, INC. OFFICES, LABORATORY & PLANT • FRANKFORT, INDIANA

Order cold-rolled sheets and strip from our new, modern continuous mill

Continuous pickling line at our new cold-rolled mill, Indiana Harbor Works, East Chicago, Indiana.

●Orders are being booked now for third-quarter shipment of cold-rolled sheets and strip from our new continuous mill at East Chicago. Let us know promptly what you need, so that we can take care of your requirements, arranging delivery to meet your manufacturing schedules. Write or phone our nearest District Sales Office.

Youngstown

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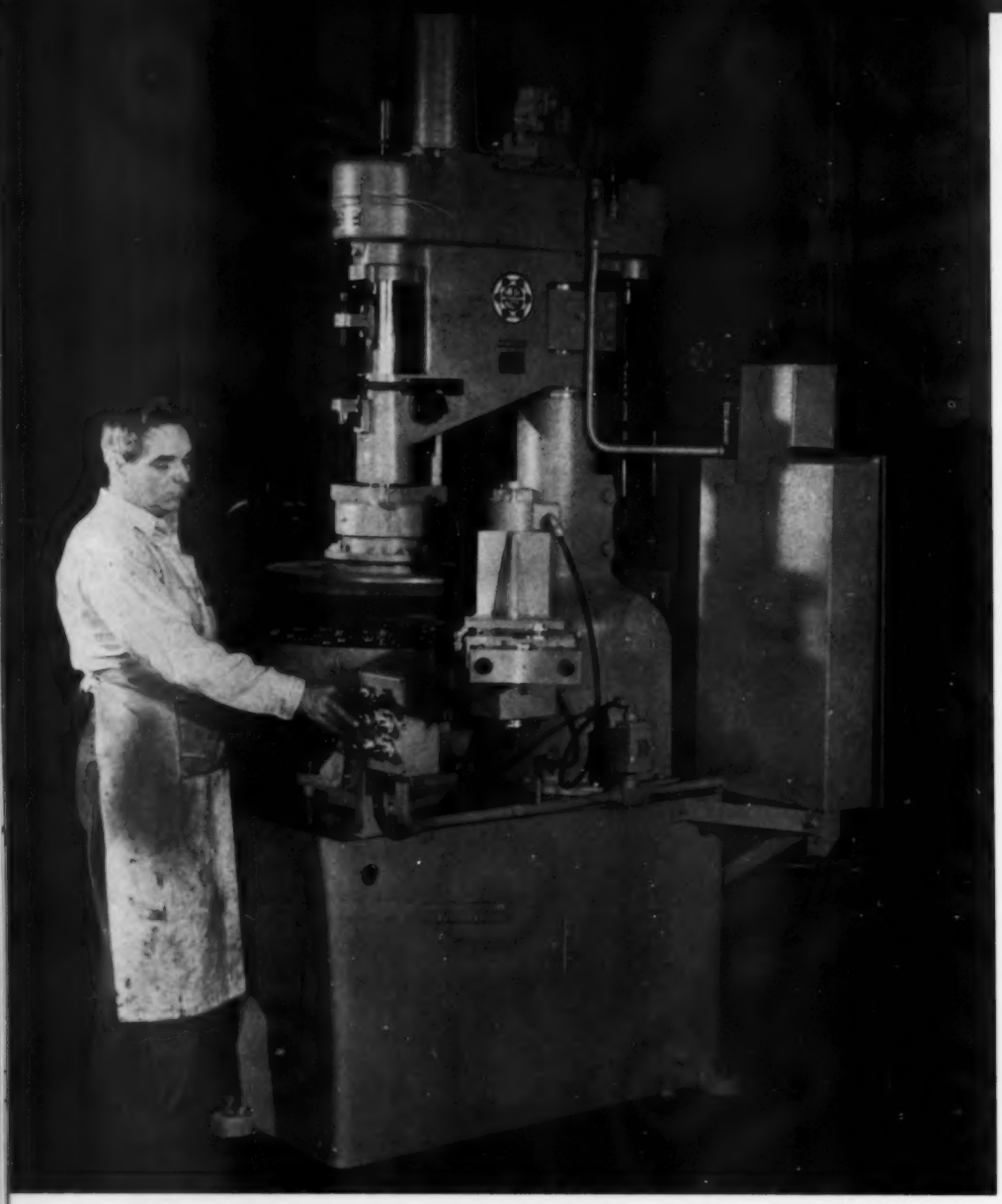
General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES



Microflat double-surface machi used in finishing two opposed s faces simultaneously. A numb of parts are mounted between t finishing plates, or bonded abr ive laps, and motions are dev oped that bring all parts of ea surface in contact with full area the finishing plates.

Abrasive finishing

describing compounds, equipment and techniques employed for lapping metal surfaces

by Gilbert C. Close • WESTERN EDITOR, AND
R. Stanley Burt • THE CARBORUNDUM COMPANY

ABRASIVE finishing is a subtractive operation during which surface imperfections are removed by a combination of grinding, peening, and cutting actions which leave the surface perfectly smooth and with a desired degree of luster.

While final machining operations and grinding may be used to remove more gross surface imperfections, the ultimate in surface smoothness is achieved by lapping. In fact, lapping is often used to remove the cutter or grinding marks left by these coarse finishing operations. In this respect, lapping removes surface imperfections of microscopic dimensions, and usually with minimum

effects on the overall dimensions of the part.

Parts may be lapped for several reasons. Chief among them is to achieve surface smoothness, and thus to reduce friction and wear. Machine gears, as an example, may be lapped to remove all grinding, cutter and other machine marks left during their initial fabrication. Other gears may be lapped to obtain perfection of profile, better gear tooth spacing, or a precision fit that eliminates backlash. Some parts are lapped to remove slight imperfections caused by warpage during heat treatment; others are lapped to obtain gas-tight fits, such as sylphon seals around rotating shafts. Pistons and cylinders are lapped to obtain a better fit and thereby eliminate blow-by leakage. Bearings, spindles, journals and bushings are lapped to obtain a better close-fit, and to reduce friction and wear. Ball bearing races, valves, gauges, thread chasers, and similar precision parts and tools are finish lapped both to achieve extreme accuracy of dimensions and to reduce surface roughness that would cause friction, heat and wear.

It is obvious therefore that a detailed description of the apparatus, set-up and technique used in lapping each type of part is far beyond the scope of this article. However, a brief discussion of lapping, the abrasive compounds employed, the types of laps used, lap materials, lapping speeds, etc., should be of interest to anyone now using, or contemplating the use of lapping techniques. The various manufacturers of abrasive finishing compounds will be glad to furnish, upon qualified request, complete data relative to the lapping of specific products, parts or tools.

Abrasive finishing compounds

Most commercially available abrasive finishing compounds are composed of abrasive particles, properly graded and sized, suspended in liquid or semi-liquid carrier media of special characteristics. The abrasive particles are usually either fused or unfused aluminum oxide, silicon carbide, or natural garnet.

Silicon carbide, because of its extreme hardness, is used in the manufacture of finishing compounds for the lapping of certain types of hardened metallic parts such as steel gears and steel valves. Fused aluminum oxide, because of its toughness and sharpness, is best suited for use in finishing compounds to be employed in the lapping and finishing of comparatively soft metals such as bronze, copper, and soft grades of stainless steel.

Unfused aluminum oxide is soft and breaks down readily under pressure during lapping operations. These properties of unfused aluminum oxide make it especially suitable for use in lapping or finishing operations which have as their purpose the generation of extremely fine finishes. Garnet, a natural abrasive, is best suited for use in finishing compounds intended for the lapping of soft metallic gears. The quality of the abrasives used in any finishing compound is dependent upon the care used in grading to exacting standard of size and particle shape.

Properties for carrier media

The liquid carrier media used in abrasive finishing compounds is usually an oil, grease or soap derivative, but exhibiting special characteristics. Any vehicle so employed must have the following properties:

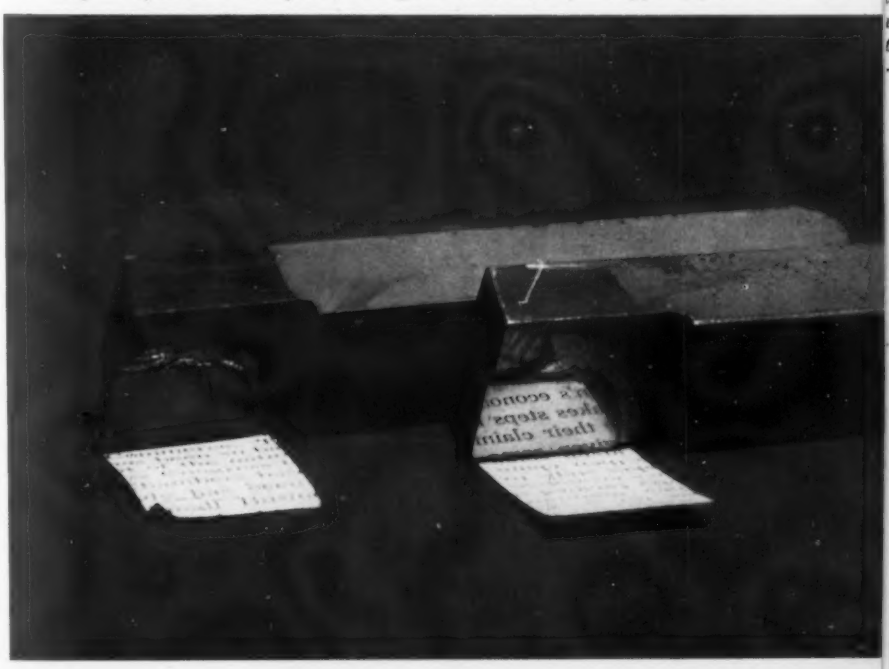
1. It must be only slightly affected by temperature changes.
2. It must provide for fast cutting without sacrifice of fine finish.
3. It must be non-corrosive.
4. It must be non-toxic.
5. It must not require highly inflammable cleaners.
6. It must have a maximum capacity for holding the abrasive particles in suspension.

The suitability of any finishing compound depends to a great extent on the proper proportioning and mixing of the compound components. This mix ratio must assure that the compounds will conform to standards which were established following careful and extensive laboratory research and actual tests under practical working conditions. After manufacture, each finishing compound should be checked to the specific standard of viscosity which has been established for that compound.

Factors influencing lapping practice

The following basic considerations, relative to factors influencing lapping practice, will apply in all lapping

Photo shows two identical carbide-tipped cutters, both well cleaned, but only one of them lapped. The superior reflectivity of the lapped carbide tip (shown by the way it reflects the newsprint) is a good indication of the type of finish obtained.



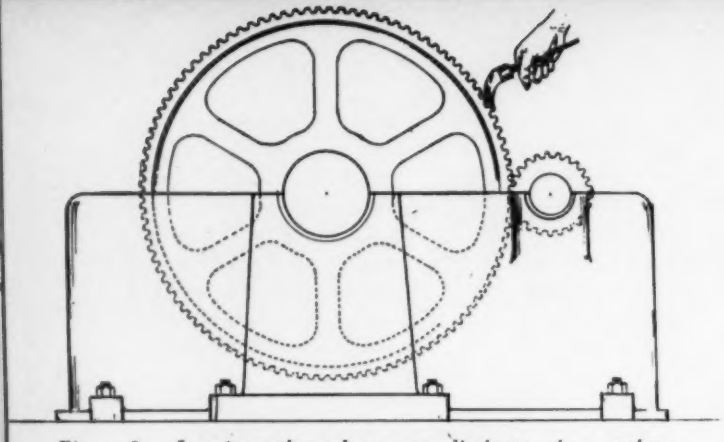


Figure 1 — Lapping soft steel gears to eliminate minor surface defects, minute machining marks, heat treat distortion or slight misalignment in final assembly.

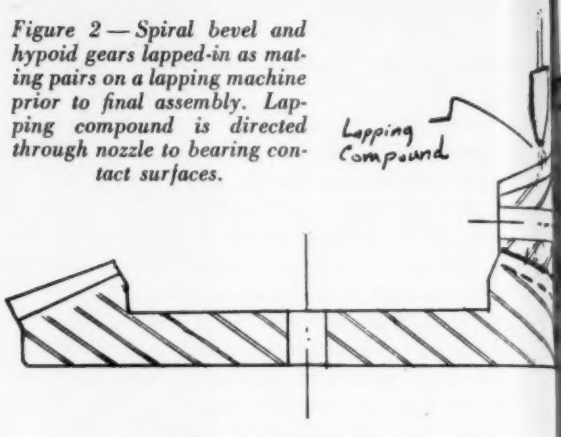


Figure 2 — Spiral bevel and hypoid gears lapped-in as mating pairs on a lapping machine prior to final assembly. Lapping compound is directed through nozzle to bearing contact surfaces.

operations, even though specific practices may vary from shop to shop. Laps are made, machined, or formed from numerous materials, including cast iron, fiber, Micarta, wood, lead, leather, felt and babbitt.

The material of which laps are made has a decided influence on the speed, accuracy, and finish generated on the work piece. The harder the lap, the slower the cut and the greater the wear on the lap. Harder laps produce greater geometric accuracy, but generally result in a duller finish. To a lesser degree, the porosity of the lap material will affect the operation. For example, open-grained cast iron used as a lap will provide a faster rate of cut than dense cast iron or steel, but with a sacrifice of luster on the lapped surface. When practical, and for best results in most instances, the lap should be made from softer material than the material to be lapped.

Variations in lapping speed, as indicated either by the rotation of the lap, or by the transverse of the work piece if the lap remains in a stationary position, will not appreciably affect the rate of cut or the finish generated within the limits of 200 to 800 s.f.p.m. (surface feet per minute). Speeds lower than 200 s.f.p.m. will reduce the rate of cut below economical limits. Speeds higher than 800 s.f.p.m. will result in a slower rate of cut with but slight improvement in finish quality.

Slight variations in pressure do not appreciably affect the rate of cut or quality of finish generated. However, excessive pressure will result in crushing of the abrasive particles, and if a relatively hard lap is being used, scoring of the surface of the work piece may result.

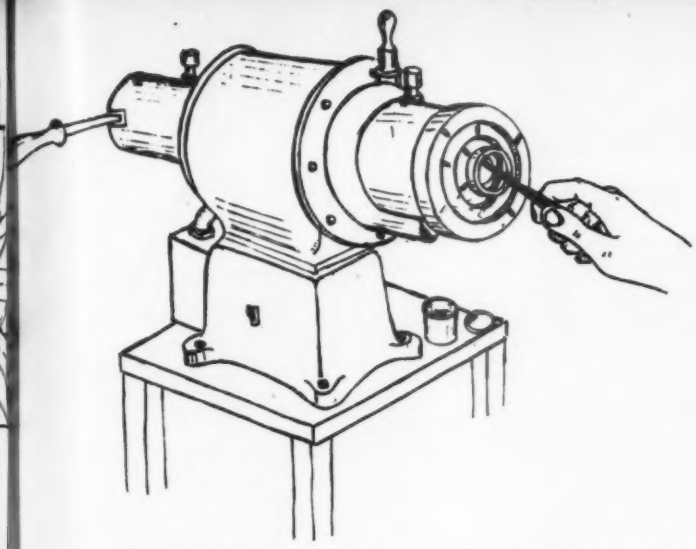
Most commercially available lapping compounds are either water soluble, or are soluble in an organic liquid. This information will be supplied by the finishing compound manfacturer. When it is necessary to thin a water soluble compound, use only water or soluble oil in small amounts, stirring well into the compound with a clean paddle. When it is necessary to thin an organic soluble compound, use clean machine oil or kerosene. Never use water with these latter compounds.

Cleaning the work piece

To clean the water soluble compounds from the work piece after it has been lapped, or for inspection during lapping, use hot or cold water with a brush for hand cleaning. Soap or detergents may be used in water solution for machine cleaning. Kerosene and other organic solvents are suitable for cleaning the organic soluble finishing compounds. The use of solvents having a high degree of flammability or explosiveness is not necessary and is not recommended.

Lapping times are determined by the hardness of the material to be lapped, the material from which the lap is made, amount of material to be removed from the work piece, amount of warpage or distortion present in the work piece, and the degree of final finish desired. Here again, only general considerations are applicable. It is quite obvious that it will take longer to lap a smooth surface on a roughly ground or roughly machined work piece than it will on a precision ground or precision machined work piece. In many

A prototype model lapping machine in use. The machine was developed by a small machine shop in Los Angeles.



e 3 — Hand lapping of internal surfaces on drawing dies in a speed lathe.

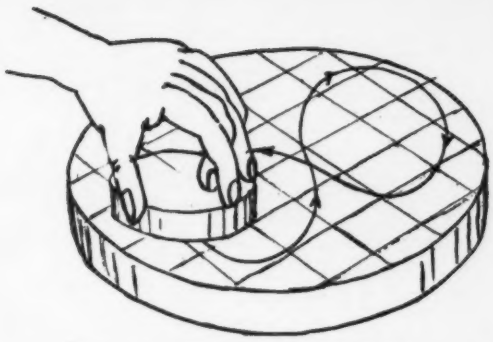


Figure 4 — Hand lapping a Sylphon seal, using finishing compound in conjunction with a cast iron lapping plate.

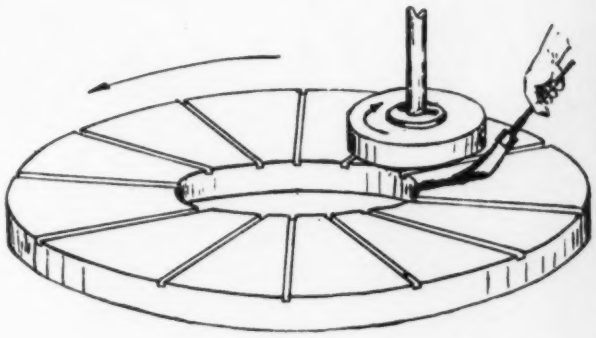


Figure 5 — Lapping extra large flat areas.

cases, lapping time will be controlled by the degree of pre-finishing afforded the work piece prior to lapping.

Lapping techniques are almost as numerous as the applications. Many of them are "spur of the moment" innovations that might not work with any other part. For instance, a small piece of leather might be glued to the end of a slim stick and used as a lap to smooth the bottom of a deep recess in a revolving part. At the other extreme, standard lapping machines are available for lapping commonly lapped parts such as precision machine gears, pistons, cylinder walls, valves, etc.

In some cases, a stationary lap is applied to a revolving surface. In other cases, the lap and work piece may revolve or oscillate simultaneously. In still others, the lap may revolve or oscillate against a stationary work piece. The exact technique to employ in special cases can be arrived at only when all influencing factors are known, but when such factors are known, originating the proper technique is usually a simple problem for a good machinist or shop engineer.

In many cases parts such as gears are lapped together after they are installed. Under these conditions, one part acts as a lap for the other. The main considerations here are application of the finishing compounds in a manner to prevent them from spreading to other moving surfaces (such as bearing boxes, journals, etc.), and thorough removal of the finishing compound after lapping is completed.

type tool lapping machine designed pri-rily for super finishing carbide tools.

Methods of applying finishing compounds

Finishing compounds are applied in many ways to the surfaces to be lapped. Hand brushing the compound onto the surface is one way; spraying it on is another. In automatic lapping set-ups used on production parts, the compound is often pumped onto the part from a circulating supply. In individual cases, the finishing compound is applied in any convenient manner to make sure that it covers all surfaces to be lapped, yet is not wasted nor causes damage by spreading to other moving surfaces.

The value of lapping as an industrial production or maintenance process is, of course, predicated upon the ultimate use and value of the part lapped. In some cases lapping is almost a necessity as when it is desired to obtain a gas-tight fit between moving metallic surfaces. As with all precision processes, other costs in the production of workpiece to be lapped might be the controlling factor, as when the cost of lapping would be prohibitive in conjunction with the cost of the unlapped part.

But in the general run of work where moving surfaces that will wear are involved, and where reduced friction is important, lapping is a process that will add substantially to the quality of a part. In tooling applications, it may add substantially to the life of the tool. In either case, the advantages to be obtained by lapping are well worth investigating.

Dual Cincinnati FINISHING SYSTEMS

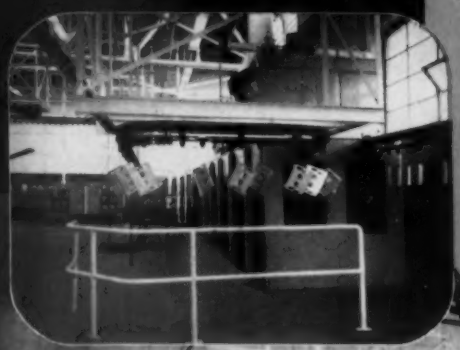
AUTOMATIC PAINT DIP and CHROMODIZER OPERATIONS:

1. Alkaline Clean
2. 1st Rinse
3. Passivate
4. 2nd Rinse
5. Hot Air Blow-Off

   All parts receive this treatment, some then go to assembly.
6. Paint Dip
7. Oven Bake

   Other parts are painted on conveyor.
8. Stripper
9. Rinse

   For empty conveyor hangers.



save 60% in time

...for noted aircraft manufacturer

A double conveyor line cleaning and paint finishing system in a well known mid-western aircraft plant handles all sorts of formed aluminum parts up to 15" x 20" in size. Moving at 18 feet per minute, the conveyors carry the parts through the various operations, removing grease, oil and chips prior to painting and assembly.

Among interesting design features: The arrangement of the system around the outer perimeter of the room, leaves the center clear for storage and loading and unloading operations. The zinc chromate dip tank has a refrigeration system to maintain tank temperature at 74° F., reducing evaporation of volatiles. The system is protected with CO_2 equipment and automatic paint tank dump.

As was done in this installation, Cincinnati Engineers will gladly design equipment to suit your needs. Whatever your cleaning or finishing problems, a survey costs you nothing, may point the way to substantial savings. Write today for booklet: "Finishing Systems."

Cincinnati

CLEANING & FINISHING MACHINERY CO., INC.
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The Apex washer

has come a long way

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... and so has Du Pont DULUX® enamel!

The Apex wringer washer of seventeen years ago was one of the smartest-looking, most efficient home appliances of the day. But there's a big difference between the 1937 Apex and the streamlined model on sale now! The 1954 Apex Wash•A•Matic, with its exclusive spiral tub agitator, gives today's housewife far more convenience and leisure than ever before. Here's proof once again that continued product improvement is vital in maintaining the acceptance of the buying public.

And so it is with America's leading home-appliance finish—Du Pont "DULUX" Enamel! Constant research over the years by Du Pont chemists has resulted in more rugged resistance to chipping, cracking, scratching and staining. "DULUX" withstands long exposures to soap powders and other cleaning agents . . . *keeps* its dazzling whiteness longer than ever before! That's why the "DULUX" of today meets the most exacting requirements of today's top-flight appliance manufacturers. E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington 98, Delaware.

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America's leading home-appliance finish

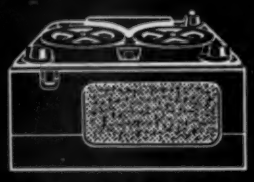
. . . has helped sell millions of washing machines!

"DULUX" ENAMEL

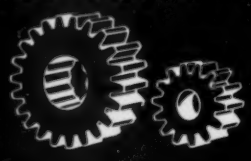
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

PREVENT Rust with MACCO BLUCOAT

the amazing between-operation rust proofing solution



RECORDER precision parts are being given the Macco Blucoat Rust Preventive treatment by one of the nation's leading electronic manufacturers.



GEARS cut, ground and tempered are treated with Blucoat to prevent rust during storage, shipping and assembly.

CARBURETOR bodies and large engine castings being treated with Macco Blucoat to prevent rust after machining and during storage.

AUTO bodies of one of the world's largest body manufacturers are given the Blucoat treatment to prevent rust before painting.

***MACCO CASE HISTORY**

Blucoat is the almost unbelievably efficient and time-tested rust preventive used by leading metal processors and fabricating manufacturers the country over. They endorse its use as the only practical method of preventing rust between production operations and assembly —and during interplant transportation and storage.

5 REASONS FOR BLUCOAT'S NATIONAL ACCEPTANCE:

1. Blucoat is water soluble, making it economical, yet extremely efficient.
2. Blucoat is adaptable to an almost unlimited variety of applications and conditions.
3. Blucoat's powerful rust inhibitor works equally well on steel, cast iron, forgings or die castings.
4. Blucoat leaves no oily film—adheres better to metal—collects less dust, chips, etc.
5. Blucoat has withstood perfectly a salt spray test of more than 80 hours. Vastly superior to soluble oil, it contains no poisonous elements. No alcohol, making it exceptionally stable.

For the prevention of rust, Blucoat positively has no equal. Whether the product be the finest of automobile bodies or simply bale tie-wires, Blucoat's versatility makes it most indispensable for any metal processing plant.

Write today or call a Macco sales engineer. Phone Prescott 9-0800, Chicago.

*Actual Case History available on request.

MACCO PRODUCTS COMPANY

9210 SO. SANGAMON STREET • CHICAGO 90, ILLINOIS

First press operation blanks the reinforcing forms for metal ironing boards; second press operation will trim. The part is then ready to be put on conveyor to be joined with top and "A" frame tubing.

Ironing board production at Arvin Industries

helical conveyor system combines with disc-type electrostatic spraying for unique continuous operation

illustrated with finishfotos

by John F. Scheier • PLANT MANAGER, ARVIN INDUSTRIES, INC., NORTH VERNON, INDIANA; AS TOLD TO *J. L. McLaughlin* • ASSOCIATE TECHNICAL EDITOR

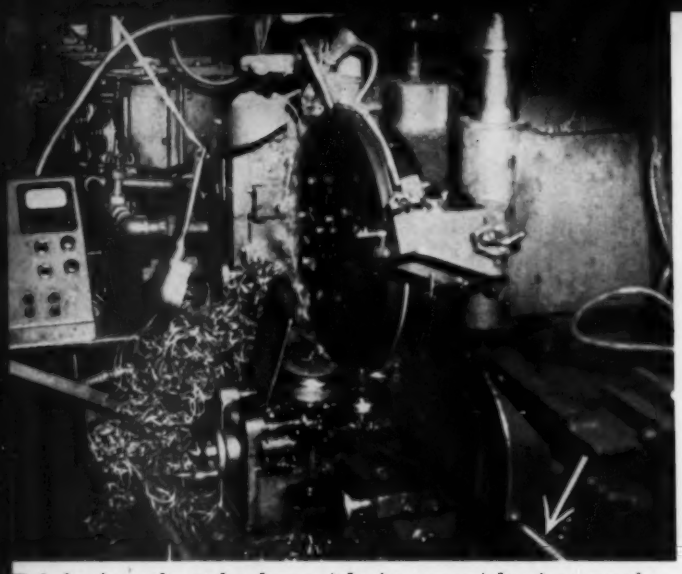
Exclusive feature finish

In spite of Mama's modern laundering conveniences, chances are she takes longer to get the family laundry ready for the ironing board than it takes the men at Arvin's North Vernon Plant to make that ironing board.

Having produced nearly three million metal ironing boards since the war, the layout and sequence of operations has been streamlined to the point where the whole operation of going from flat steel sheet to the finished board, packaged, labeled and stored in the railroad box car, takes approximately two hours. (They admit the board is still warm when it goes into the car.)

Operations begin at the receiving end of the plant, where sheet and coil stock is sheared and slit to proper size for the parts into which it is scheduled to be formed. Once in motion, the pieces hardly stop until they arrive in the box car.

Large quantities of coil stock are used to make the tubular support members of the board. These are routed to a lower floor, where they are roll formed into tubes to be assembled to the ironing board tops on the final assembly line. →



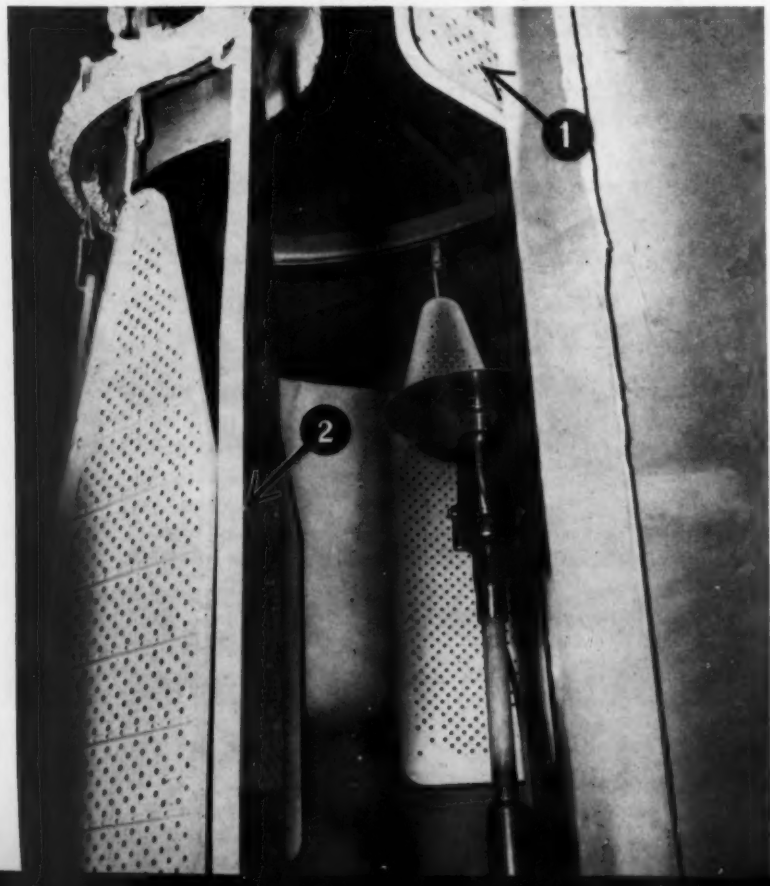
Tubular formed metal at lower right (see arrow) has just passed between forming rolls which shaped it from coil stock. Tube next passes under continuous seam welder, on past cutter head which shaves off weld lump, through cooler (hidden from view), then through a second series of rolls for accurate sizing.

First side sub-assembly operation of making the frames to fit the top of the ironing board. Operator uses hydraulic bender to A-shape in tubing. Machine beyond operator notches the bent to accept support assembly. A second bending operation (not then forms the tubing to the contour of the board.

Fabricating ironing board tops and top-reinforcing

The sheet stock goes to make the top parts of the ironing board. Top and top reinforcing pieces are sheared and then slit on a roll slitter. The top sheets then head for a blank and forming press on one side of a laydown conveyor, while the reinforcing sheets for the top go to a press on the other side of the same conveyor. The top, after blank and trim operation, is placed on the belt conveyor. A tubular strengthening rim is placed inside the top directly from a side assembly line where straight lengths of tubing are formed first into simple A-frames, and then, by hydraulic automatic horizontal benders, completed into a shape to fit snugly inside the partially formed top to act as an edge stiffener. The hydraulic power used in the forming operation is applied only when microswitches touched by the piece indicate it is properly located. When correctly located, the bend is automatically made without manual action.

Close-up view looking into circular spray booth. This is second spray station with ware spiraling down to the left from upper right. Center top (Arrow 1) shows the bottom corner of a piece just entering the booth while the full length top (Arrow 2) is leaving. Notice the close proximity of pieces entering and leaving the booth. The portion seen below the atomizing disc has been coated, but that portion above has not. The paint seen on the top area was deposited as wrap-around when the reverse side was sprayed in the previous station.



The top reinforcing piece progresses from the blank and forming press to the trim operation, and then is placed on the laydown conveyor and inside the top coming from the blank and trim presses. The three pieces, nested together, are carried down the conveyor to the top crimp press. When the under structure is crimped to the top in the press, the reinforcing tube is enclosed and locked inside the top.

The parts are hung on an overhead conveyor and passed to the washer; then the dryer, where they are dried at 350° F. for 25 minutes. This high temperature and long time are necessary to drive off the entrapped water picked up and held in the enclosed tubes.

Double conveyor services both tops and support members

Front and back leg assemblies were observed coming out of this same dryer. These parts have been fabricated from flat coil stock about three or three and one-half inches in width. These coils are set on spindles and fed into a series of machines which perform all the operations.

The strip passes between a series of rollers that gradually lift the edges of the strip up and over until they meet to form a hollow tube, at which point a continuous seam welder completes the tube. The tube passes through a cooler and a shaper, and into a stab cut-off which automatically cuts the tube into the desired lengths and drops them into tote boxes.

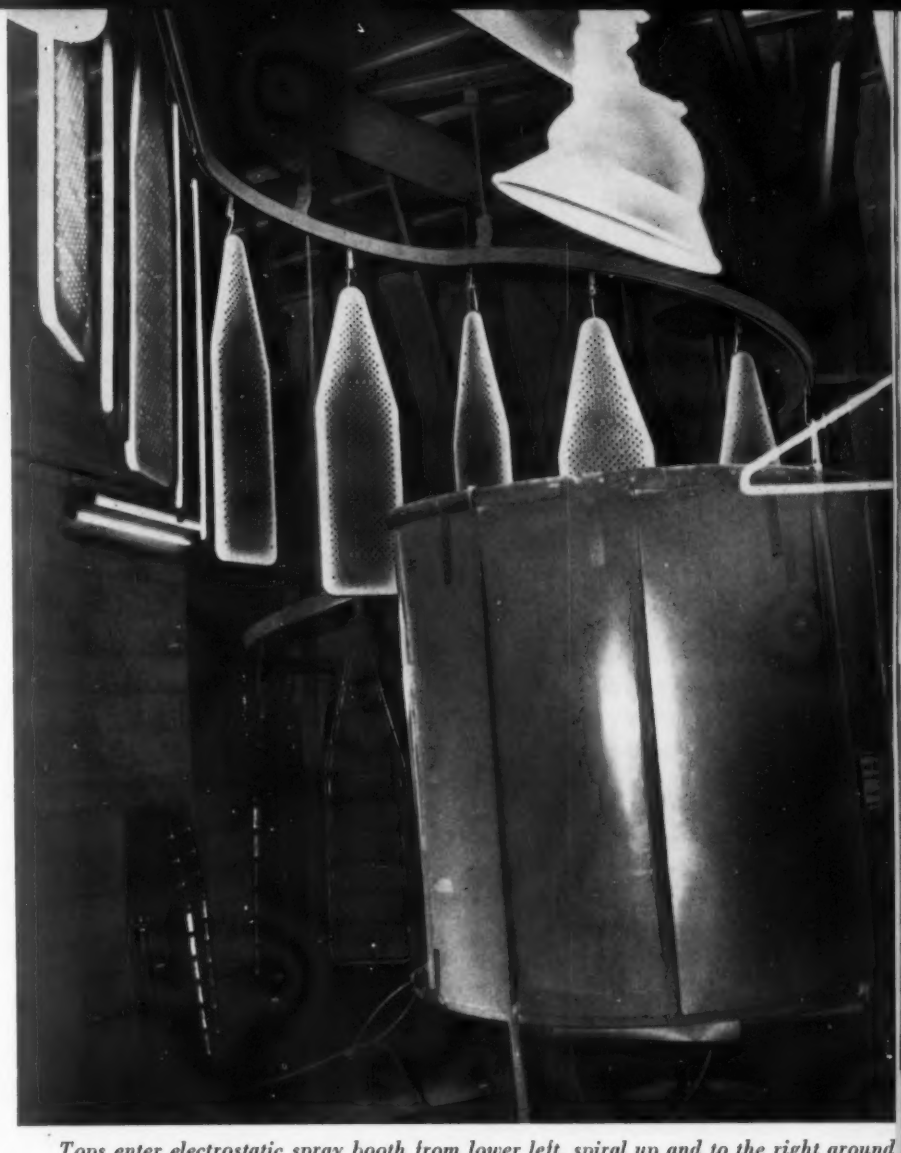
Each tube length is brought into a press for shaping, and then subassembled into one of three support sub-assemblies. These are hung on an overhead conveyor which passes through the oven where they parallel the flow of the tops. The leg assemblies and long support members are dip coated, baked, and conveyored to the final assembly area.

Newest type electrostatic spraying system used

The top assembly passes along a conveyor parallel to the leg assembly line, by-passes the dip tank, enters an adjoining room, and is sprayed by the latest innovation — a system combining airless atomization and electrostatic spraying.

Helical-shaped conveyor, circle bunching, airless atomization *combine* to give unique system

To avoid confusion with other types of electrostatic systems, here are some of this system's salient features. The atomizing mechanism consists of a vertical pedestal, on top of which is mounted a fractional horse power motor. A tube is fixed to the shaft of the motor and a flat disc or plate with a small hole in the center is attached to the tube. When the motor rotates, material is fed under very slight pressure up through the pipe and onto the plate, where centrifugal force brings it to the perimeter of the plate and disperses the paint into a fine mist. The revolving plate causes the paint to leave the edges of the plate traveling in 360° from the center of the plate, and in a plane perpendicular to the axis of rotation.



Tops enter electrostatic spray booth from lower left, spiral up and to the right around the disc atomizer (inside cylindrical booth), and exit toward upper left. This operation sprays the back or underside of ironing board. The painted side seen in the upper left is not the side painted, but merely the overspray or wrap-around which the electrostatic force has deposited on the side opposite that getting the coating.

The system would appear to have several undesirable characteristics, but each of these characteristics has been turned into a distinct advantage. This is an outstanding example of how modern industrial ingenuity can turn adversity to an advantage.

Since the atomizer emits paint in 360°, it must be completely surrounded with ware if all the paint atomized is to be used. This is accomplished by leading the conveyor around almost a 360° turn, providing only enough open space so the ware has clearance to pass. Then, regardless of the direction that the paint leaves the revolving disc, it strikes the ware. Since at turns the ware tends to bunch (reduce interval), there is no necessity for a bunching conveyor, as the hooks can be so spaced as to provide the minimum safe clearance on the turns.

This provides efficient usage of paint, but poses a problem on items having greater vertical dimensions than that of the dispersion of the paint coming from the disc. Where the length of the piece demands more distribution, the designers of the

Ironing board tops, after leaving bake oven, are inspected and labeled.

equipment have presented one of three answers.

Developing a system for dispersing paint vertically

There are currently three ways that the paint can be made to traverse the vertical length of the piece as it hangs on a conveyor. On small pieces the motor and plate can be inclined at an angle from the horizontal so that the paint comes from the rotating disc at different angles as the work circles around the spray station.

The second method of spreading the paint is by mounting the motor assembly on a reciprocating piston and elevating the mechanism.

The third system, and that used in the Arvin plant, is the most spectacular by virtue of its simplicity. Vertical distribution is accomplished by inclining the conveyor as it circles the revolving disc. This provides a helix or screw-like path around the atomizer. Pieces traveling along the conveyor pass around the atomizer, and as they circle, are elevated in relation to the disc, so the paint progressively impinges on lower parts of the piece.

This coats the material on one side principally, but the reverse side also gets a wrap-around application of paint which is driven to it under the influence of the electrostatic force provided in this system. The reverse side is painted by reversing the process. That is, by directing the conveyor along a declining helix. If the first circle around the atomizer had been clockwise, the second is counter clockwise. The second operation also returns the conveyor to its original level.

While in theory this appears simple, actually there are some problems of considerable magnitude to overcome. One of the most difficult was the development of a conveyor system which would follow such a serpentine path without jerking, binding, or breaking. The solution was developed from a commercially available conveyor of the type having vertical wheel roller carriers and lateral roller units. These roller units are an integral part of the chain and ride inside a closed box-type channel with every alternate set of pulleys set at 90°. This permits the conveyor to follow compound curves and to travel around curves of very short radii.

The photos accompanying this article show the tortuous path these conveyors are capable of following. The system depends heavily upon this capability to reduce the complexity of the application. As now installed, there is essentially no inconvenience associated with transportation of the pieces in the painting zone. Nor is there any attention needed to influence the uniformity of the spray over the surface of the piece. Both of these problems are effectively handled by the conveyor as it carries the pieces past the atomizing discs on the way to the paint bake ovens.

High percentage of overspray is gainfully used

The curvilinear shape of the spray station along with the effect of the electrostatic influence capitalizes on the ability of this system to pull the overspray away from the exhausting path and to impinge on the back side

to Page 61 →

Final assembly line using power tools to speed up assembly of undercarriage of tops. Assembly is completed in two steps by four men. Completed boards are then inspected for operation before packaging.

Ransburg Electrostatic Processes

Whether it be painting of automobile bodies —(in one case, saving $1.81 per body)— or painting smaller automotive parts, RANSBURG ELECTROSTATIC PROCESSES are accounting for substantial savings to the manufacturer, and to the buying public. *An accumulated savings amounting to several dollars per car!*

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Only Porcelain enamel, the *fused-in* finish, gives you all these advantages:

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Porcelain Enamel Division

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Small part of Norton Company's complete stock of Ferro furnace plates, in service inventory at Norton's Worcester, Mass. plant. Other Ferro distributor points are located at Norton warehouses in Cleveland and Chicago, ready for immediate shipment when needed.

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When you need furnace repairs, replacement parts, or even entirely new furnaces, there's a Ferro service point in easy shipping distance . . . and trained Ferro engineers to do the job in record time, at least cost to you.

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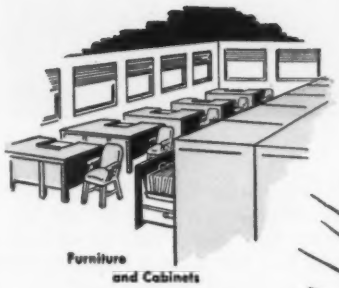

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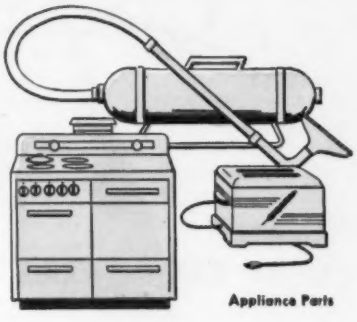
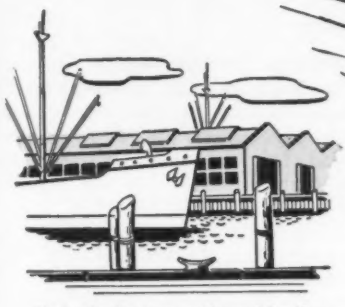


Appliance Parts



Marine Applications and Many Other Uses

now made possible with **DU PONT VITREOUS ENAMEL**

Get all the advantages of aluminum— in colors that help your product sell better

The remarkable properties of Du Pont vitreous enamel for aluminum permit a new, wider use of lightweight aluminum alloys. This outstanding protective finish enables you to take advantage of aluminum's desirable features in a variety of structural and decorative applications. And Du Pont vitreous enamel adds a wide color appeal to your household and industrial products—gives them another important sales advantage.

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Almost unlimited range of colors and degrees of surface gloss available . . . can be produced in multi-color effects by masking, spray or screen stencil processes.

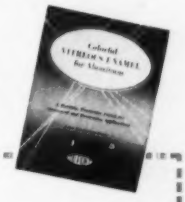
Du Pont vitreous enamel for aluminum is lightfast . . . displays excellent resistance to corrosion, abrasion, thermal shock, impact and flexing . . . has a high dielectric strength.

A standard thickness coating of vitreous enamel increases the rigidity of sheet aluminum as much as 60%!

Vitreous enamel is readily applied by ordinary enameling and firing procedures.

FOR MORE INFORMATION SEND FOR YOUR FREE COPY OF THIS BOOKLET

Vitreous enamel for aluminum is fully described in this free booklet—just fill out and send in the coupon below.



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THE finish LINE

a guest EDI RIAL FEATURE

by Charl alon Conway

THE trend today i "living" kitchens. Perhaps that adjective, "l not as descriptive as we would like it to be, bu *se Beautiful* interpret it as meaning a room that i , homey, that people like to be in.

It is the direct oppo otic. It doesn't remind you of an operating ro re institutional kitchen in a hotel or university. y it is a family room. A home room.

Some years ago wo anding for their kitchens the same warm, background they have in the rest of their of background is not white, whether you are practical enough in our organizatio o the appliance industry to be perfe e simply horrible headaches in an ap umerous colors, for all levels — mant ealer. So we fully realize that the in li-ances is not an easy thing. B for color, and the industry had it is going to be too bad.

Now, who is it who has put up a living kitchens? Is it some name de Hollywood star? Is it some society l top-lofty magazine that thinks it has all th none of these, and I hope I can explain how about.

The publication entree to accurate "home" inf

But I would like to interrupt myself to tell you a li about the way *House Beautiful* operates. We do not fill pages in photograph or copy with theories that have no foundation in fact. We are, first, observers and we travel like wild Indians across this entire country in order to be thorough observers. We are then reporters. And after that, interpreters of what we have seen and noted to the trade, to the consumer, to everyone who is concerned with the home.

The publication has nothing to sell. We have no brooms or brushes or vacuum cleaners or silver or fancy shampoos. For that reason, we are able to get a foot in the door of private homes the country over. We have invaluable contacts in the architectural and decorating professions, as well as in manufacturing industries, and these friends of ours keep us posted about new developments wherever they may occur. So the front door is always open to us. Appliance manufacturers, unfortunately, cannot get into private homes the way we can. Maybe you want to call us snoopers; we are, to a degree. But we are able to sit down and tal with Mrs. America, find out what she likes and doesn't like and, what's even more important, *why* she does or doesn't and come back with some very exciting data that we ca use to great advantage.

An "across the country" survey report

In this connection I would like to tell you about an experience we had two or three years ago. Our editor-in-chie decided that we would run a complete kitchen issue. Abou twelve months ahead of the date set for that issue we starte traveling all across the country, looking for interestin kitchens. East to West, and North to South. We were n looking for anything in particular; we did not know i advance what we would find; we certainly were not lookin for a "living" kitchen. We were just there to see what wa happening to kitchens. We selected a lot of kitchens whic subsequently were photographed.

When we got back to the office in New York, and laid ou all the pictures we had taken, we were a little surprised t find that the great majority were "living" kitchens. We wer surprised, too, to find that the majority showed a lot o wood finishes, natural wood. Some had flagstone floors, o brick. When our kitchen issue hit the newsstands, some o our trade advertisers hit the ceiling, saying we were agains anything but wood and brick or flagstone. But this was no the case. We had not set out to do that. We were simpl reporting, and that is the way we always operate. So yo can now believe me, I feel sure, when I say we are not subsi ized by any particular trade group, when I report that th trend is toward living kitchens. It is just a fact, and th whole industry has to cope with it.

Now, it is none of the sponsors I mentioned before wh is responsible for this trend. Not the decorator, or th Hollywood star, or the society matron, or any magazine It is the social and economic trends of our times.

The one social trend that is most universally understood think, is that we don't have servants any more. The lad house is her own maid. She is in the kitchen a great than she ever was before. Maybe she had *never* re, and therefore didn't care what it looke I don't have any recollection of eve itchen when we five children wer top of the back stair ful ba help of he friends in doing room, and what more mand for color and for a warm

The "parties" end up in the kitchen

There is another social trend today, and that is, th families are staying at home more than they used to d

THE APPLIANCE FIELD

Numerous statistics have been compiled in an attempt to trace the reasons. Maybe it is the high price of going out; maybe it is TV; it is pretty hard to prove. But probably it is a combination of many things. The fact remains, people are staying at home more and that means entertaining at home. How many times have you heard it said, "All of our parties end up in the kitchen!" Well, the kitchen had better be nice or they won't.

All these social and economic factors have an effect on absolutely everything that goes into the house. It is not only the appliance industry that has to watch out. It is the glassware people, and linen, and rugs and carpets, and furniture, and everybody!

Changing homes — changing architecture

These social and economic forces have also had their influence upon architecture. You don't need to be told anything about the high cost of building today. The cost is so high that houses — and the rooms in them — are getting smaller and smaller. To counteract the actual lack of space, some architects have turned to what we call in our business open planning. There are many fewer partitions than there used to be. That not only saves building costs; it lets you see from one area to another and visually creates the illusion that the house is larger than it is. This lack of partitions often applies to the kitchens as well as to other rooms.

Kitchens are not enclosed in four walls the way they were, shall we say twenty years ago. Many of them are open to view the minute you step through the door. And that is the way Mrs. America wants it. . . . Not only that, but kitchens are moving from the back of the house to the front where Mrs. America can see who is going by and what is going on. With the kitchen moving up to the front of the house, it obviously demands good architecture and good decorating in a way quite different from that of the days when it was isolated somewhere in the back of the house.

The factors of pride and prestige

There is another factor: Because Mrs. America spends so much time in her kitchen, she takes a tremendous pride in it. I think this is something not yet realized by the appliance industry and all its allied industries, and certainly not yet capitalized on. As I travel around the country, th... I find that women are just as proud of their ki... the newest appliance in it, as once w... with the automobile. Th...

...ent. By the ...surface unit with burners in one place, and the oven, or even two ovens, in another. They may be adjacent to each other, or on opposite sides of the room, according to the convenience of the family and the plan of the kitchen. But really and truly, I don't think it was wholly the convenience factor that guided these people to choose these, as much as it was appearance. With component ranges, there is no sore-thumb white enamel exterior to interrupt the pleasant wood feeling or maybe the colored cabinets or green and red wallpaper. Because when component ranges first came out they were made of stainless steel, a good neutral color, something like aluminum or stainless steel pots and pans, or even a little like sterling silver. And so they did not interrupt the color scheme.

Someone has told me that there are now seventeen lines of component ranges on the market. I saw fourteen of them at the Chicago market in January. It appears that they are all doing business, good business. This could not be true if component units did not make sense appearance-wise and function-wise.

Built-in refrigerators are coming

I have had several designers and engineers in my office discussing confidentially whether the American consumer wants a built-in refrigerator or not, how it should be dimensioned, etc. In February of this year, *House Beautiful* published its Pace Setter kitchen. Each year we publish a Pace Setter house which, in our opinion, is pace setting in architectural design, house plan, materials, engineering, and so on. For this Pace Setter kitchen of 1954 I had two refrigerators built, and set in flush with the wall. . . . The kitchen was all done in marble, mahogany, stainless steel. It was a very handsome job, and I shudder ...ink what it would have looked like with even one w... ...nce in it.

This built-in refrigerat... ...mething to watch. Aside from the Pace ...ve photographed several where the ... ordered their built-in refriger... ...ly firms, because these w... ...Other families have ... ...of wood. This ... ...domesti... ...away

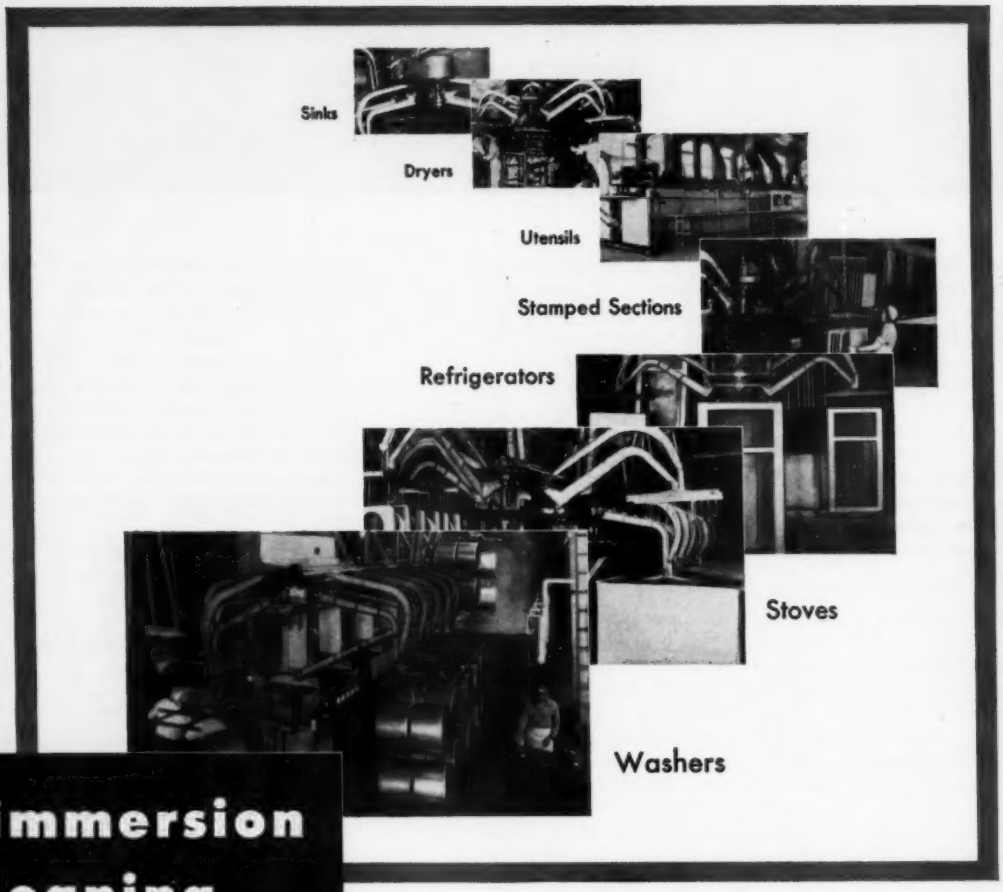
...rs ago. He said, "Well, you can have any color ... want so long as it's black." Chevrolet sells the ... with color. Ford hasn't caught up yet. I suppose ... you probably don't want to be like that.

Editor's ...

In the January 1954 (10th anniversary) issue of *finish* ...resented a guest editorial on "Home Appliances in Color" by Mrs. Conway, equipment and appliance editor, *House Beautiful*.

This later article represents some additional thoughts on the same subject by Mrs. Conway, and is adapted from her recent presentation before the Eastern Enamelers Club, in Philadelphia.

Mrs. Conway reports that she recently resigned from *House Beautiful* to start a kitchen planning service in the state of Vermont.



For immersion cleaning and pickling

vitreous enameling processors choose . . .

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Manufacturers of vitreous enamelware know that careful choosing of the right manufacturing methods and equipment paves the path to profit. That's why so many use Stevens machines for immersion cleaning and pickling of their ware.

Stevens equipment is available for cleaning and pickling products ranging from small pans to refrigerator assemblies. Mechanically flexible, Stevens machines are easily altered for increased output during plant growth. Their simplified construction offers uninterrupted production. Among other features of Stevens machines that delight production manager and cost accountant alike are:

1. Tremendous work output at low per square foot cost.
2. Thorough cleaning of recessed areas without spray nozzle and pump maintenance.
3. No scratching or marking.
4. Extremely low acid and cleaner drag-out losses.
5. Minimum number of high cost racks or carriers required.
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If you process metals, Stevens will design a machine to help you increase production and cut costs. Let us show you the facts. Call a Stevens Sales Engineer or write Stevens direct.

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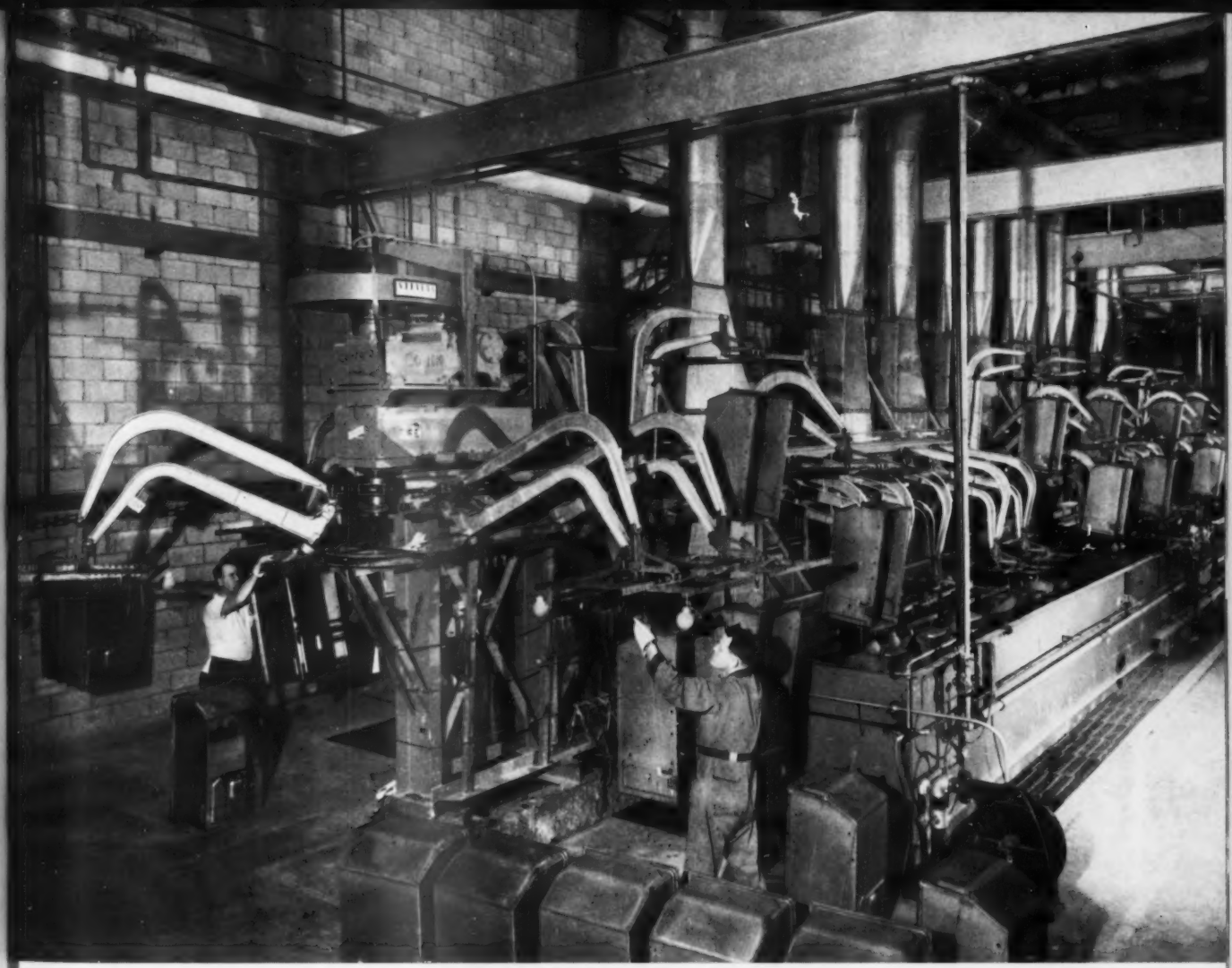


Cleaning and pickling for porcelain enameling is accomplished in this arm-type machine with service conveyor so arranged that no steps are required for loading.

Metal preparation and finishing at Westinghouse

new plant incorporates proven practices established in other Westinghouse plants

(second of a series)

IN describing the metal preparation and finishing facilities at Westinghouse's Columbus plant, it can be said that in general conventional methods and processes have been employed. All equipment is new and based on experience in other Westinghouse plants. All major operations are conveyorized, and much floor space was saved through use of overhead ovens and auxiliary equipment.

The same inspection pattern as followed for welding, sub-assembly operations and surface finishing extends to degreasing, rust inhibiting, porcelain enameling and exterior organic finishing.

Metal preparation

Condensers are degreased before side brackets and yoke are welded in place for mounting the compressor.

Two cleaning machines are used for *compressor parts*, either prior to inspection or before assembly. Parts are cleaned free of chips and oil, rust preventative, light dust from storing and transportation, or heavy abrasive deposits.

The smaller machine is a conveyor spray washer, 31 ft. long overall, employing a 24" wide slat conveyor to carry the work through the ma-

The white finish coat of acid-resistant porcelain enamel is sprayed on the inside surface of the food liners in well ventilated water-wash spray booths. Next the compartments go through a dryer (210° F.), then the corners are brushed and they are fired at 1380° F.

chine. Large parts are placed directly on the conveyor slats; while smaller parts are handled in baskets or racks. This machine cleans parts such as pistons, wrist pins, connecting rods, cylinders, etc. The machine is loaded manually at one end, and a gravity roller conveyor takes the work from the unload end to the next operation.

The larger of the two machines is a combination slat conveyor and monorail conveyor spray washer. It is 41 ft. overall, and does the work of two machines. A 30-inch wide slat conveyor carries parts through the machine and at the same time an overhead monorail conveyor travels through the machine, carrying such parts as rotors, end heads, and shells. This monorail is part of a continuous system which brings work from various parts of the plant and carries it through to the air conditioned assembly room.

A feature of both machines is large side access doors, giving ready accessibility to the interior of the machine and spray systems. A system of double doors and mechanical seals permits an operator to open them immediately after the pump is shut off, making it possible to locate clogged or misdirected nozzles.

Both machines are equipped with "petroleum fitted" pumps, explosion-proof motors and explosion-proof starters and wiring. Each machine has a self-contained automatic CO_2 fire protection system with "rate-of-rise" heat detectors. A pressure switch shuts down the operation in case of hazard.

Each machine is equipped with a centrifugal purifier. After going through the wash and rinse stages, parts are finally rinsed with clarified solvent before drying. A counter-flow arrangement continuously refreshes tank contents.

Both machines employ water cooling coils in the wash and rinse tanks to keep temperatures at safe level. Thermostatic controls regulate the flow. Water cooled "after condensers" regain from the exhaust air some of the mist and droplets of the petroleum base solvent entrained through the vents.

Cleaning and pickling of refrigerator food compartments is accomplished within a single pickling machine. The machine is a high lift arm type immersion unit, operating at a chain speed which passes 120 bars per hour (two food liners can be hung to a bar). There are eleven tanks and a drier arranged in an oval permitting loading and unloading in adjacent stations. *(See schedule, page 90.)*

The service conveyor system has been so located in relation to the pickling machine that no steps are required by the operator between loading and take-off. In addition, a cushion is provided in this area for

On the left are ball mills of 6000 lbs. ca in which the frit and enamel materials ar ed by overhead chutes from the second After grinding in the mills, the enamel loaded by gravity into a pump and pum overhead tanks of 1200 gal. capacity

banking of food liners on roller conveyors both before and after pickling.

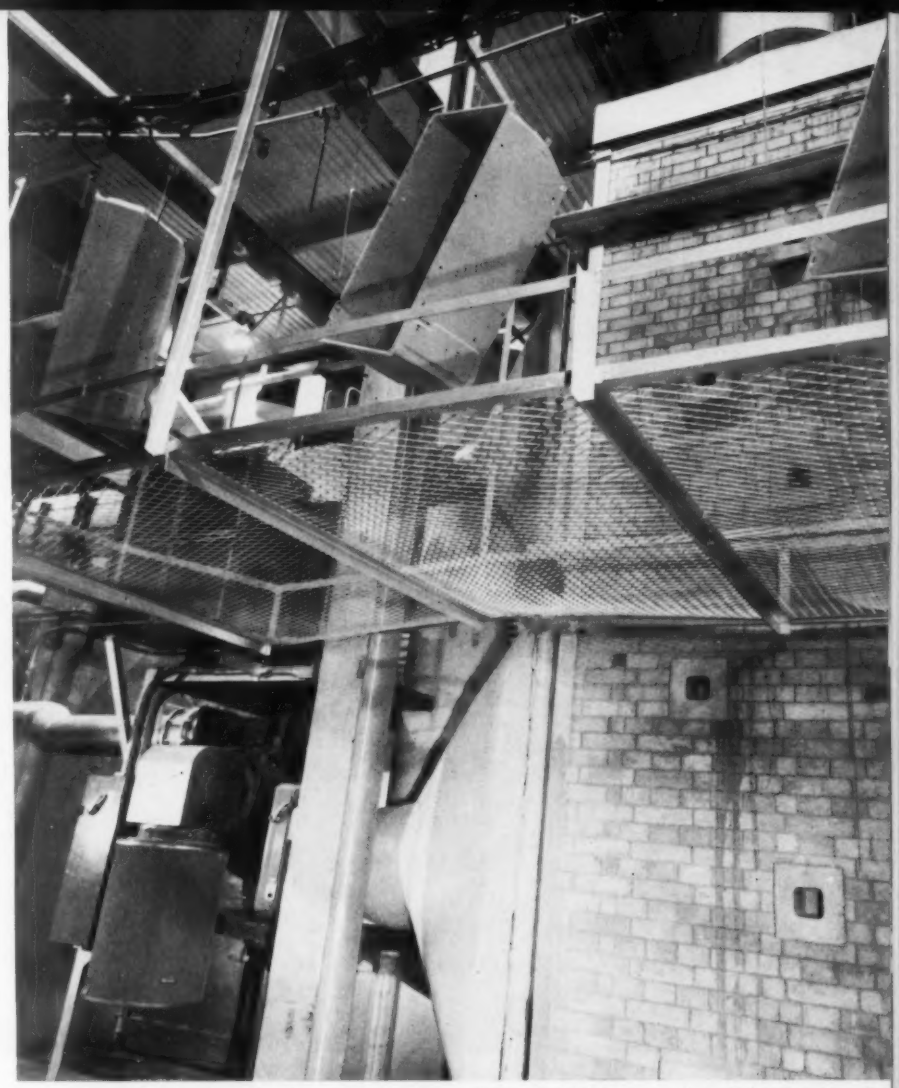
Recharging to maintain strengths in various tanks is accomplished by replenishing those chemicals lost through chemical reaction. This may or may not mean the additions are the same as the charging chemicals. The cleaner for replenishing has a lower soap content than the original charging material.

The nickle tank employs a continuous recirculating filter to keep a clarified solution. The first neutralizer using tap water also uses a filter, but the second neutralizer using deionized water remains clear without a filter.

Ten pound lead weights are used, two to a liner, to sink the liner, keep it at the proper angle in the tanks, and prevent it from floating off the carrier hooks during immersion. The weights also help to eliminate fluid carryover.

A service conveyor carries cleaned food compartments direct to the dip tanks for ground coating.

Cleaning and phosphatizing for organic finished parts, such as exterior cabinets and door shells, is done in an overhead continuous 6-stage unit. While the chambers for processing



On right in photo is shown recuperator through which air is forced for heating by flue gases from ground coat furnace. Heated air is used in overhead dryer where the white enamel coat is dried. This recuperator furnishes 50% of heat necessary to operate the dryer, the other 50% furnished by white coat furnace.

lbs. ca... storage tanks, the enamel is drained by ials ar... ity through centrifugal sieve and magnetic second ...rator into the eight pressure vessels (250 namel ... capacity). The finished enamel is then d pump... by air pressure through pipes to various pacity ... enamel spray booths in the plant.

the work are overhead, the solution tanks are at floor level, where they can be easily serviced. Solutions are pumped up to the chambers by centrifugal impeller-type pumps to spray nozzles. *(See schedule, page 91.)*

Porcelain enameling

The porcelain enameling department houses three continuous furnaces. Two are now in operation; a third is under construction; and plans provide for a fourth.

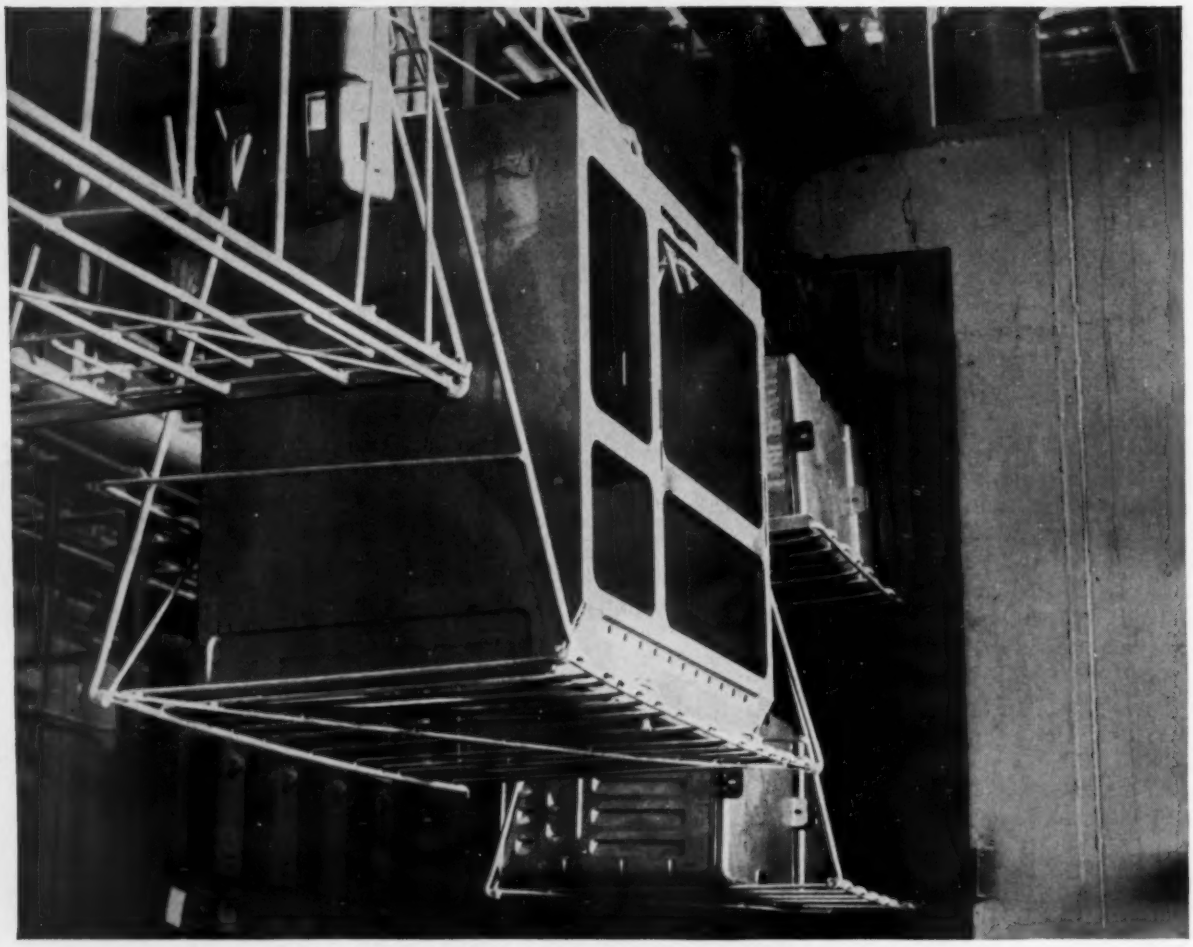
Both ground coat and cover coat furnaces are gas fired. Natural gas is used, but there is standby equipment for the conversion to propane.

The mill room houses four 6,000 pound, one 1500 pound, one 1,000 pound, one 300 pound, and one 35 pound mills. Loading is through stainless steel chutes from overhead frit and chemical storage.

Milled enamel discharges by gravity through 20-mesh screen to sump and by pump to a series of eight overhead storage tanks (1200 gal.) with intermittent agitation (1 hour per shift — Saturday and Sunday, 15 min. per shift). From this point, the slip is dropped by gravity through a centrifugal sieve and magnetic separator to 250-gallon pressure vessels at floor level, and piped to dip tanks and spray booths. In addition, there are two storage tanks on the mill charging mezzanine for reclaim.

Food compartments are roll-dipped in shallow dip tanks. Slip is recirculated through a stationary screen and magnetic separator.

to Page 48 →



Range parts entering the 9-stage washer. The addition of Pennsalt EC-54 permitted a 30° temperature increase in the first stage spray, gave faster, thorough cleaning of high-melting-point soils.

MAJOR APPLIANCE MANUFACTURER ADDS NEW PENNSALT CLEANER...GETS "100% CLEANING"

Rejects were practically eliminated. Solution life increased more than three times in the first stage. Parts can now be porcelain enameled without danger of poor coatings.

Pennsalt EC-54 Allows Higher Solution Temperature without Evaporation! Solutions Last More Than Three Times As Long!

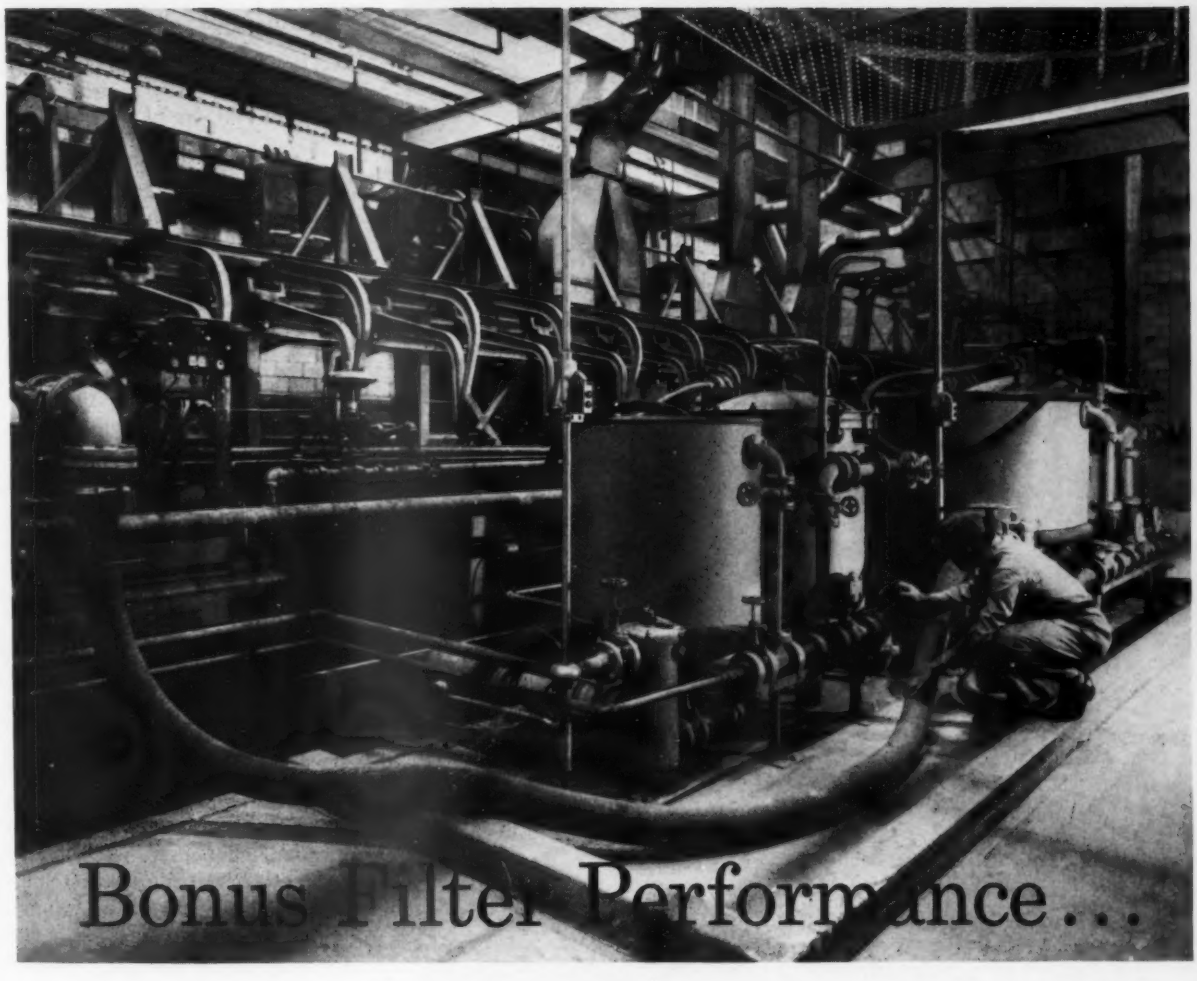
This well-known manufacturer runs a wide variety of hard-to-clean items in sequence through the same spray machine. Every trace of drawing compound and plant soil must be removed before porcelain enameling. Rejects due to poor cleaning were frequent.

The Pennsalt representative recommended adding a high-boiling-point emulsion cleaner, Pennsalt Cleaner EC®-54, to the initial cleaning spray. When this was done, the manufacturer found he could raise spray temperatures 30°. This extra heat made the difference between a poor cleaning job and an excellent one. EC-54's high flash point provided a wide margin of plant safety in spite of the higher temperature.

The added emulsion cleaner cut cleaning costs by increasing solution life, too. The #1 tank (Pennsalt Cleaner EC-54 1:100 and Pennsalt Cleaner #32 ¼ oz/gal) is now dumped once a week, instead of every other day. And the #3 tank (Pennsalt Cleaner #32 2 oz/gal) now lasts 10 days, instead of one week.

For more information on trouble-free metal cleaners designed for modern production conditions, call your local Pennsalt Metal Processing Specialist. Or write: Metal Processing Dept., Pennsylvania Salt Manufacturing Co. *EAST:* 805 Widener Bldg., Philadelphia 7, Pa. *WEST:* 2168 Shattuck Ave., Berkeley 4, Calif.

Pennsalt Chemicals



Bonus Filter Performance...

On Nickel Dip and Neutralizer Solutions at New Westinghouse Appliance Plant, Columbus, Ohio

A view of the two INDUSTRIAL filters—one on the nickel dip solution and one on the neutralizer solution. Each is a complete unit with primer-strainer tank, precoat slurry tank, filter, pumping unit, and all valves for filtration, addition of filter aids, free pumping, and filter drainage. Each filter is furnished with INDUSTRIAL air-wash manifold for cleaning filter.

Adequate turnover in the continuous filtration of the nickel dip and neutralizer solutions by the INDUSTRIAL filters assures dependable clarity. Furthermore, the air-wash cleaning feature eliminates the opening or dismantling of the filter for cleaning. The removal of the cover is necessary only for replacing the filter cloths or for periodic inspection—a great time and labor saver. It is this overall bonus performance that accounts for the universal use of INDUSTRIAL filters with the vitreous enameling processes.

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INDUSTRIAL FILTER & PUMP MFG. CO.

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PRESSURE FILTERS
ION EXCHANGERS
RUBBER LININGS
HEAT EXCHANGERS
CORROSION TEST CABINETS
CENTRIFUGAL PUMPS

Left: After fabrication, condensers receive black enamel coat in spray booth in background, then pass through this overhead infra-red oven for quick drying of the enamel.

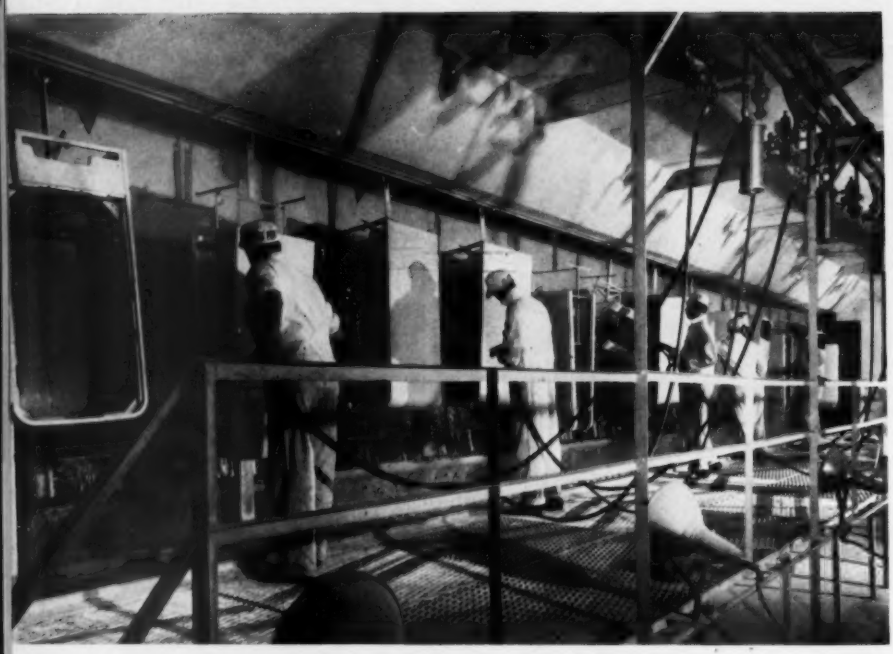
Center: Cabinets and doors are given final white paint coat in water-wash spray booth. Paint is piped from mixing room and is circulated continuously through the system.

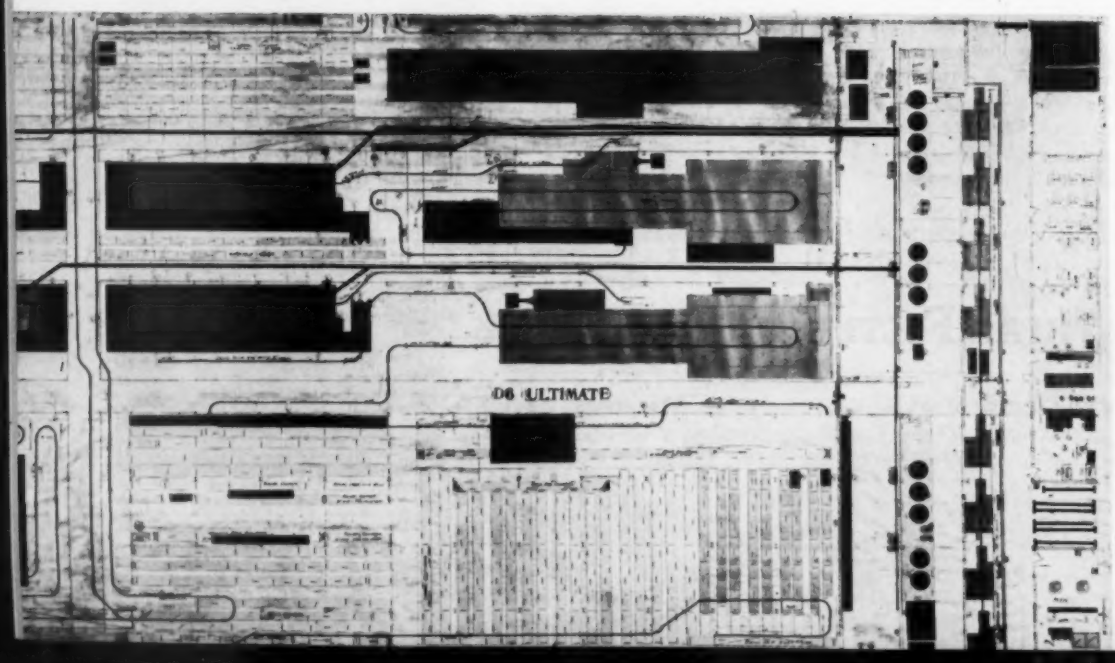
Parts are hung on dryer conveyor with two hooks to evacuate the superfluous enamel and provide proper drain. The liner is carried along conveyor into dryer.

Ground coat is dried in an overhead oven, using two gas fired heaters (natural gas, propane standby). Temperature: 170° F. for 15 minutes.

The ground coat is fired at 1430° F. for 4 minutes, in a furnace having a 65 ft. hot zone — 96 inch side walls (also natural gas fired with propane standby).

Cover coat enamel is applied by hand spray method on a continuous conveyor. The white acid resistant enamel is applied in a well ventilated spray booth, with filtered and pressurized air. *The booth is a combination wet and dry type.* Dry baffles catch some of the overspray. Behind these is a drop chamber where air velocity is reduced—causing more of the airborne material to drop. This is followed by four rows of baffles similar in shape to the ones in the front of the drop chamber but suspended by airplane type cables above

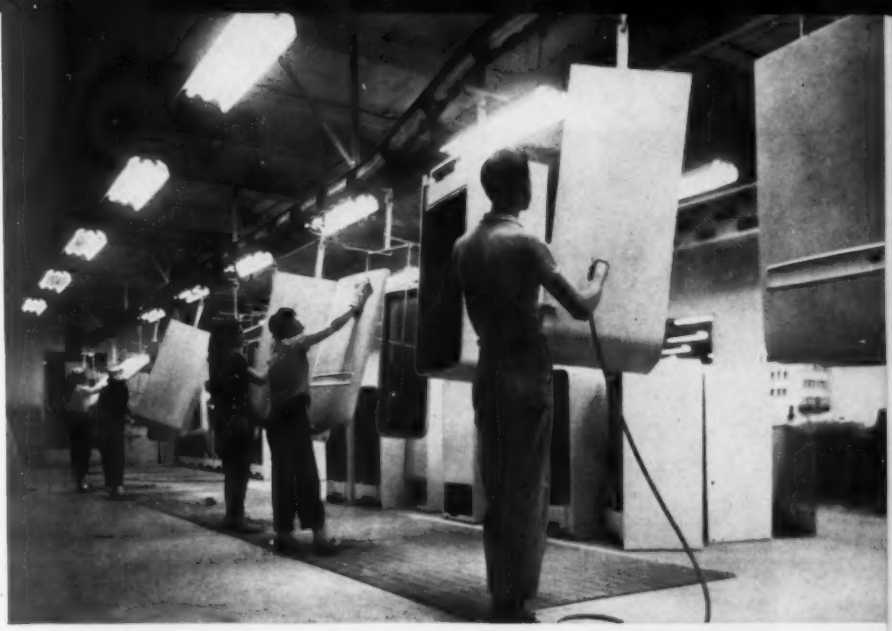




A section of porcelain e eling department. At ri mill room with storage head. Extreme right c is laboratory. Top c shows the pickling ma at left of which are floor roller conveyor banks. the machine is ground furnace, and next (cent finish coat furnace. R erator heat from fur serves cover coat dryer. left are ground coat dip and finish coat spray ro Bottom conveyor lines for storage. (A duplica entire set-up is provide and is under partial struction.)

Right: Cabinets and doors are inspected and any blemishes in prime coats are sanded down by hand. Dust from sanding is removed with "tack cloth" and blowing with air jets.

Center: From final coat baking oven, cabinets and doors are inspected at transfer area where parts are transferred to assembly line conveyors.



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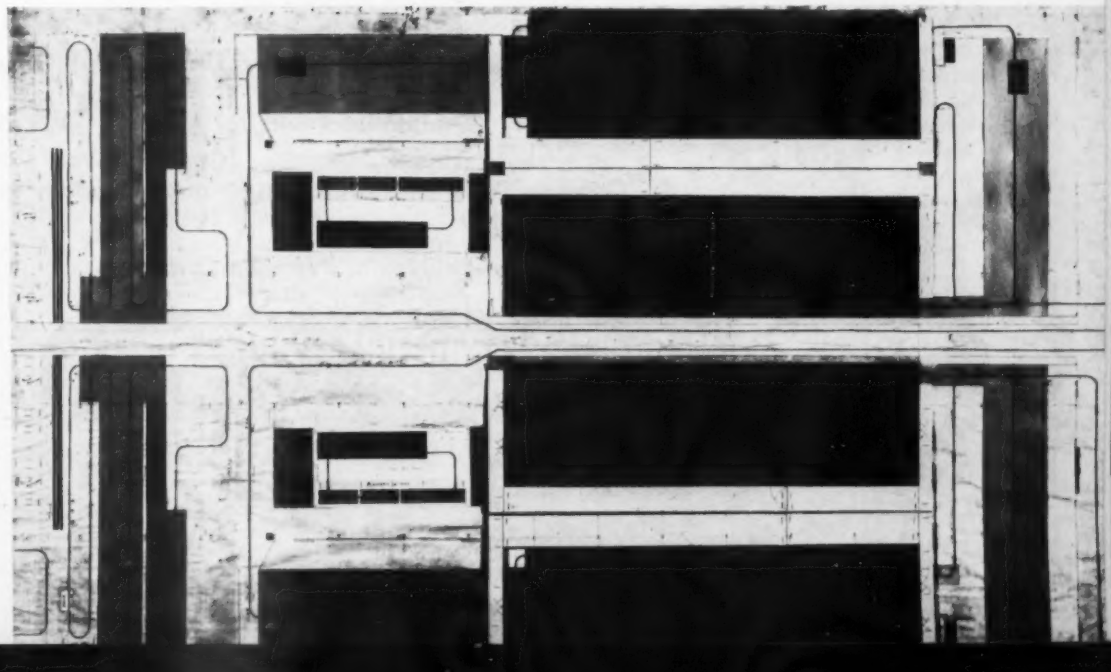
a water tank. Automatic timers successively submerge each of the rows, keeping three rows of wet baffles suspended in the air stream at all times. The wet baffles catch and remove the remaining dust particles in the air.

From this point, the compartments go through the overhead dryer (210° F.) followed by corner brushing. The dryer is heated by two recuperators, one from the cover coat furnace, and one from the ground coat furnace. The dryer is also equipped with gas burners for standby use. Firing is at 1380° F. for 4 minutes.

The food compartments are then conveyed to a sub-assembly area, where all shelf supports are inserted and speed fasteners and tap bars are put in place for attaching the evaporator. The inner liners then move by overhead conveyor to assembly line.

Organic finishing

The *refrigerating* unit (completed assembly) is sprayed with black enamel and dried in an overhead lamp-type infra-red oven. *to Page 90* →



...al set-up (upper and lower ...) for organic finishing. ...m left to right, cleaning ... phosphatizing, transfer ...m chain to paint convey... Left center (top) is first ...t primer spray room (65 ... long). Top black area, ...mer bake oven, below ...ich is sanding and tack ... area. Flow is right to ...ish coat spray room (gray) ...wn to second black area ...nish coat oven). Convey... leaves oven at lower right ... inspection and assembly. ...ain (4500 ft.) is also used ... for overhead storage.

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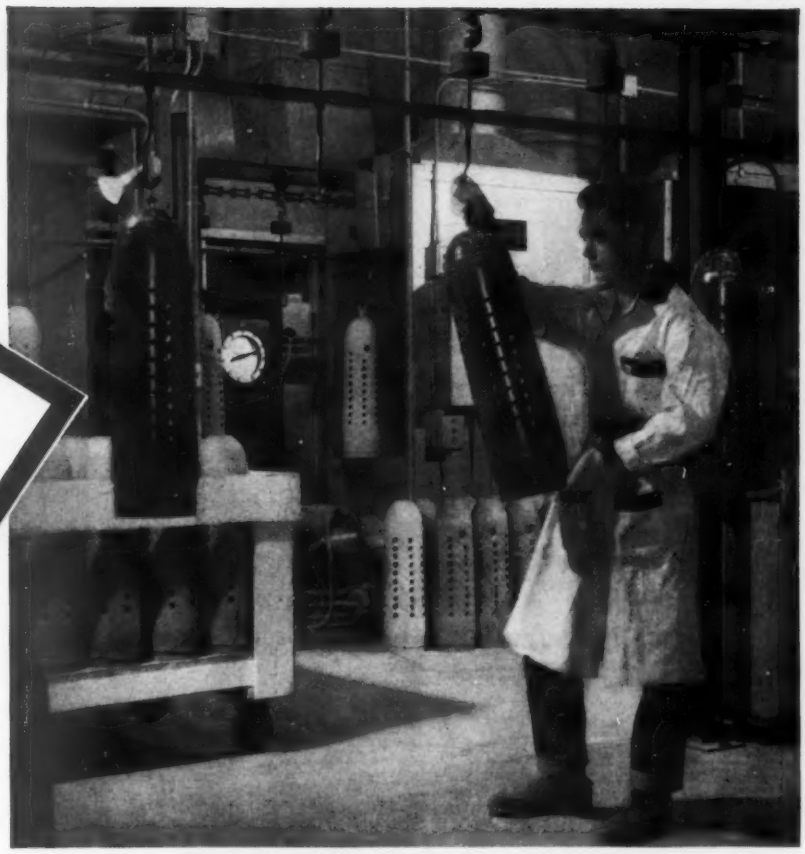

These parts are being processed with Solaramic coatings in the nation's first conveyorized mass production facility for applying high temperature coatings to alloy steel components. The drop rods, on which the parts are hung, are made of strong, heat-resisting Incoloy.

On Incoloy Drop Rods at 1800°F

The nation's first conveyorized, mass production facility for applying high temperature ceramic coatings to alloy steel parts is now in operation at Solar Aircraft Company's San Diego plant.

The parts to be coated are first sand blasted. Next they are sprayed on the inside with a Solaramic coating, hung on Incoloy® drop rods on the assembly line and sprayed on the outside.

Then the conveyor line travels at two feet a minute through gas-fired direct flow dryers operating at 150° F. After drying, the parts enter the gas-fired furnace where the coating is fired at a temperature of approximately 1800° F. through a 15-foot zone.

INCO

And here's where Incoloy shows its stuff!

Day after day, burning tools of this heat-resisting Inco Nickel Alloy go through the furnace and effectively resist the corrosive attack of the combustion gases at the 1800° temperature. And, moreover, they resist scaling, so spoilage is kept to a minimum.

Like Solar Aircraft Company, you, too, may find Incoloy the right material for your burning tools and fixtures.

Because of its excellent strength (up to 1850° F.) and corrosion resistance, Incoloy can be made into lightweight equipment. This newest member of the Inco family is readily fabricated into burning tools of all types. It is both workable and weldable for maximum flexibility in efficient design.

If you would like to learn more about Incoloy, write for your copy of "Progress Report on Incoloy."

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If you haven't as yet offered this feature to your merchandising outlets, let us show you how simply and inexpensively this sales tool can be offered — and the sales result you may expect.

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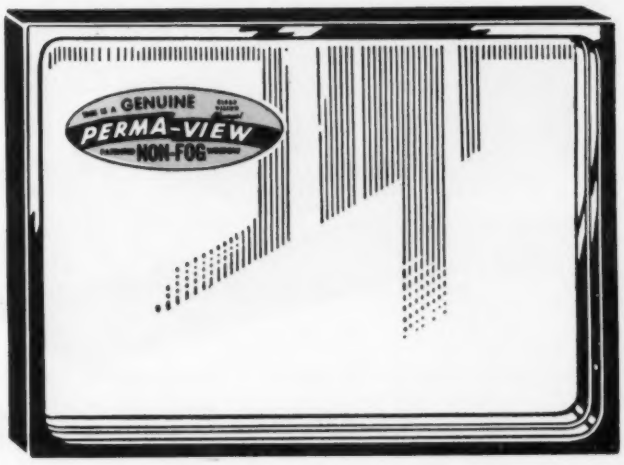
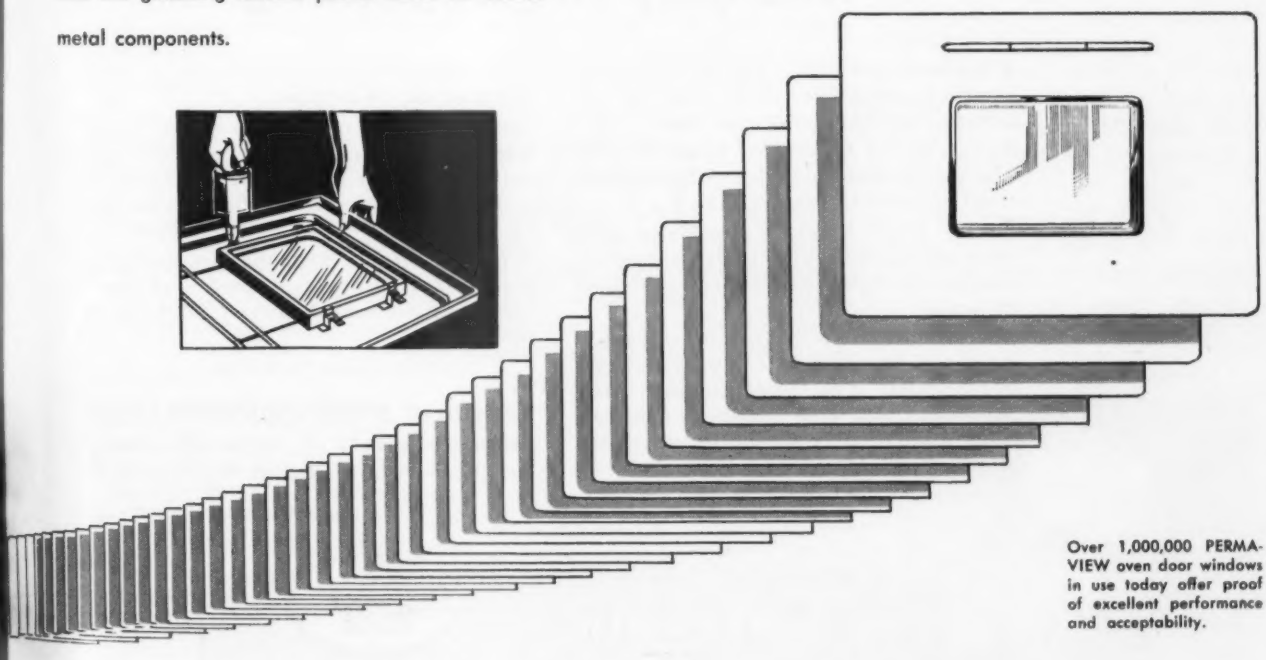
PERMA-VIEW's crystal clear glass and gleaming chrome lend eye-appeal and salable beauty. The built in seal provides the "no-fog" feature and assures a clearly visible oven interior.

Only top quality materials are used in the Mills' plant, including the heat treated, crystal clear glass and the gleaming chrome plated metal for visible metal components.





Over 1,000,000 PERMA-VIEW oven door windows in use today offer proof of excellent performance and acceptability.

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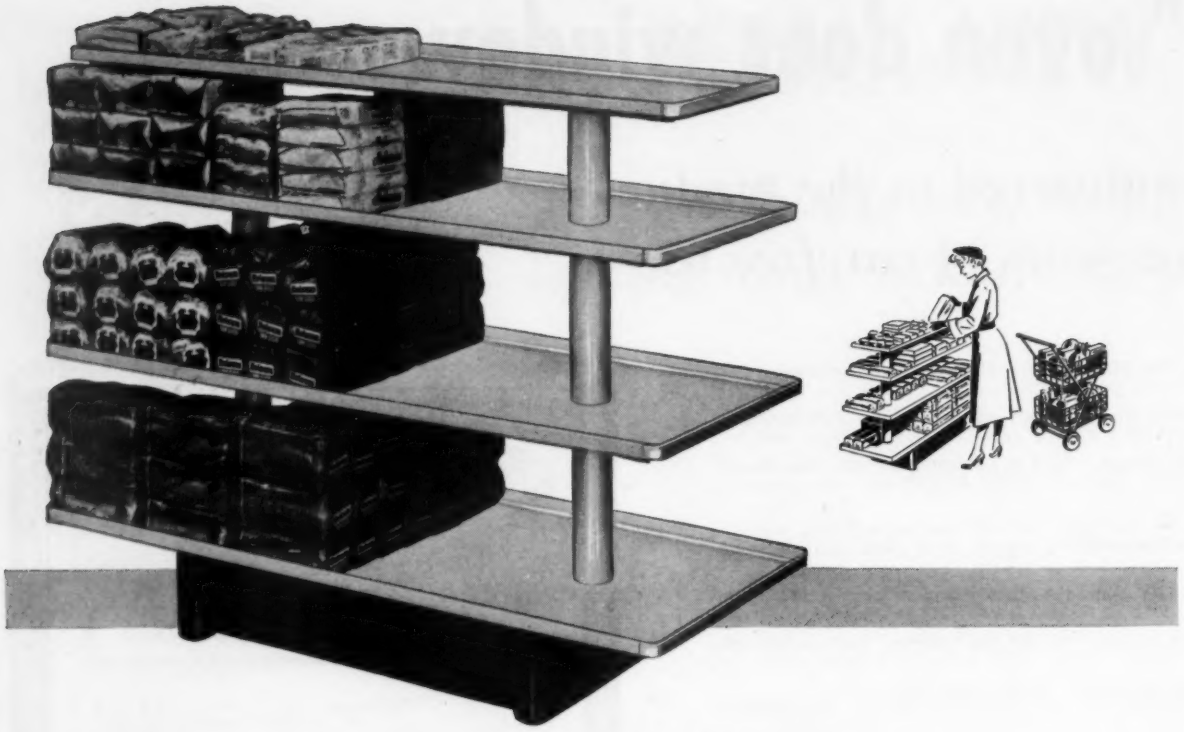

The finish was only the beginning

A baked-enamel finish applied to Republic Electro Paintlok was the beginning of customer-attracting appearance and longer service life for this bakery goods display. The unit is made by Modern Metal Products Company, Greensboro, N. C.

Electro Paintlok is the zinc-plated steel sheet that is chemically treated to take paints, lacquers, synthetic enamels—and hold them for years.

Selection of Electro Paintlok for this application was based on the company's success in fabricating it for other products. They knew the tight zinc coating would not crack, peel or flake during normal fabricating operations. They also knew their entire finishing operation would be speeded.

Electro Paintlok requires no special cleaning—only the removal of finger marks and warehouse dirt. The surfaces require no preetching. They are pre-conditioned for application of the baked-enamel finish.

Why not consider Republic Electro Paintlok for making your fabricated steel products more attractive, more serviceable, at less cost?

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New officers of ASTE, left to right: H. E. Collins, 3rd v.p.; H. C. McMillen, 2nd v.p.; H. B. Osborn, 1st v.p.; J. P. Crosby, pres.; Harry E. Conrad, exec. sec.; Wayne Ewing, sec.; R. C. W. Peterson, treas.; H. D. Long, ass't. sec.-treas.

ASTE show draws 28,700 tool engineers

subjects discussed at technical sessions include cold forming, fasteners, lubricants, cold pressure welding, plastic tooling, metal cleaning

THE 22nd annual meeting and concurrent industrial exhibition of the American Society of Tool Engineers, held in Philadelphia, April 26-30, drew an attendance of over 28,700 persons.

The display of nearly 500 equipment exhibitors covered an area of approximately 160,650 square feet.

Many phases of metal working operations were discussed at the various technical sessions. Following are brief excerpts from talks presented before the technical meetings.

Cold pressure welding

Laboratory experiments on joining of metals by pressure are paying off in production line results, stated W. A. Barnes, vice president, Utica Drop Forge & Tool Corp., who described some of the tools, similar to pliers but capable of exerting tremendous pressures on small areas, which are used for cold pressure welding. The process is said to give excellent welds on copper and aluminum.

Cold forming of steel opening new horizons in design

Squeezing cold steel into intricate shapes in 3000-ton hydraulic presses is opening up new horizons in basic designs for a multitude of products, according to D. I. Brown, market development manager, Mullins Manufacturing Corp. *(See "Mullins Research Baby Goes Commercial", March 1953* finish.)

"The advantages of this relatively new method are apparent in the clean designs that are possible with a minimum of operations. The research and development began with experimental production of 105 mm shells in 1950," stated Brown.

Typical of the products that can be made more economically with cold extrusion of metal, Brown said, are the hydraulic accumulators that are stronger, more precise, yet half expensive as those made by an older method of welding caps on a tube.

Fastening useless parts into useful assemblies

Find new ways to speed the fastening together of "useless parts into useful assemblies" and you speed production of thousands of common household items as well as industrial equipment, W. C. Stewart, technical advisor, Industrial Fasteners Institute, challenged a conference of top ASFE executives and engineers.

"It is safe to say that an important part of all human labor in factories is spent in applying fasteners. . . . My best advice to you,"

to Page 59 →

J. P. CROSBY, ASTE PRESIDENT

New ASTE Officers

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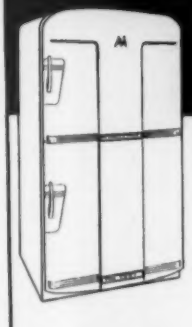

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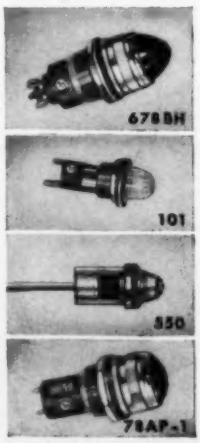

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SOCKET & JEWEL LIGHT ASSEMBLIES

→ *from Page 55*

Stewart told the engineers, "is to be aware of the flexibility of the fastener industry. It will be surprising indeed if you don't find a better and more economical way of fastening your products. . . . There are a great many special devices which will enable you to save money in your plants."

3-D plant layout models

The advantages of utilizing 3-D planning for new factories and business offices were presented by H. H. Dasey, president, Visual Plant Layouts, Inc.

He described how 3-D plant layout models, actually similar to three-dimensional doll houses and model towns, "leave nothing to guess-work, require no explanation or translation, and provide the best insurance against costly mistakes" in planning new industrial plants and buildings of all types.

Using radioactive materials as safety measure in press shops

Hands of punch press operators spotted with radioactive materials will stop a punch press in mid-stroke, should an accident-provoking move be made, stated Lionel Goldring, nuclear chemist, Nuclear Development Associates, Inc.

Goldring cited a number of cases of industrial applications using radioactive materials to solve production problems. He gave assurance that the most careful governmental supervision safeguards workers against radioactive dangers.

Plastic tooling for appliances

Lower prices of home appliances and automobiles can be achieved by wider use of plastic tooling, according to G. C. Adams, staff engineer, Rezolin, Inc.

"Entirely too many people are prone to think of the appliance industry, the automobile industry, or many other industries as requiring tooling for millions of parts. This is not correct. In many cases, the required production consists of only a few thousand parts . . . . Properly designed and built, plastic draw dies will economically handle this type of production schedule," Adams said.

Continuing, he stated that "many articles which otherwise would probably never be produced in large quantities" can be produced on a larger scale by substituting plastic tools for metal tools. High production is being achieved already, he said, with cases of 30,000 parts produced on a single plastic die. Another advantage is that in many cases plastic dies can be made in as little as one-fourth of the time required for metal dies.

Cutting costs with rivets

Small rivets that cost only a fraction of a penny can result in lower prices of "just about everything from home appliances and automobiles to luggage and wooden boxes," according to V. L. Bradford, vice president, Milford Rivet & Machine Co.

Bradford cited the savings and increased production achieved by a maker of fluorescent lighting fixtures. He said that an expensive two-part assembly was replaced by design enabling the use of a rivet with a resulting saving of close to $10,000 per year on this part and a production increase of almost 400%.

Unlimited future for cermets

George Stern, vice president and technical director, American Electro Metal Corp. reported on strides being made with cermets in solving production problems for jet aircraft.

"Conventional alloys simply won't do", Stern stated, "because they drop off markedly in physical properties at about 1700° F." Powder metallurgists solved the problem with the development of cermets, which are a combination of ceramics and metals.

Stern added that the future of cermet materials is unlimited because they easily withstand temperatures ranging from 1700° F. to 2500° F.

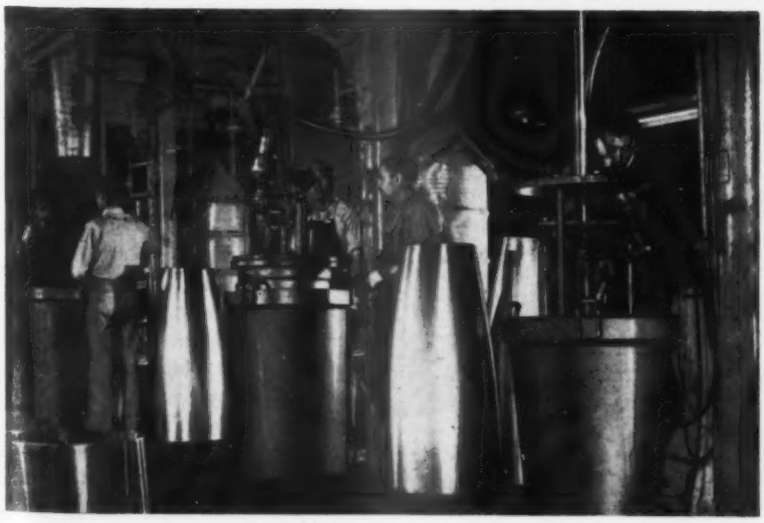
A jet engine compressor blade was cited as a case in point. Powder metallurgy not only gives the blade superior physical properties but conserves tons of alloy steel and chromium, said Stern.

Lubricants for stretch forming metal

Bees wax, paraffin and wax paper are some of the "broom closet" items which industry is now using to keep friction at a minimum when stretching steel, titanium and other tough

to Page 94 →

Stretch-forming *— jettisonable fuel tank parts is accomplished in a single, fast operation by this battery of hydraulic forming machines at Pastushin Aviation Corp., Los Angeles. Welded blanks of aluminum or steel are formed without pre-forming within two minutes to shapes of compound contour free of wrinkles or tool marks. The machines consist of an elevating mechanism, and a rubber punch hydraulically-expanded against a steel die contoured to finished part size with tool plastic.*



HIGH SPEED BAKING

3 TO 10 MINUTE TIME—AUTOMATIC CONTROL

HANDLES ANY MATERIAL
ANY SHAPE
ANY COLOR

In the "world's most modern refrigerator plant," The Hotpoint Co., Chicago, Ill., uses this compact "J" shaped Fostoria Infra-red oven to dry vitreous enamel ground coat on refrigerator inner liners. Total heat zone time is 3¼ minutes. Operating load is 450 KW. Production rate is 140-160 liners per hour.

Profit WITH MODERN FOSTORIA OVENS

ALL THESE ADVANTAGES

FASTER CYCLES
Fastest heat transfer. Greatest output to input. Instant action.

LESS SPACE
Most production for oven size. May be ceiling mounted.

CLEAN OPERATION
No by-products of combustion. No condensation.

UNIFORM BAKE
Evenray heat distribution with thorough penetration.

FLEXIBILITY
Adaptable to any material, any shape, any color. Infinitely variable heat levels.

SAFETY CONTROLLED
No warm-up, no shut-off lag. Instant heat control.

LESS MAINTENANCE
Lowest source replacement cost. Least efficiency loss.

HIGHEST EFFICIENCY
Less than 2% energy loss. Heats product—not oven walls.

CUTS COSTS
Lowest "per piece" production cost. Competitive initial cost.

RELIABILITY
Foremost engineering "know-how" and service.

Greater production efficiency is the keynote for the competitive era ahead. New methods, new modern equipment are vital to reduce man-hours, lower production costs, increase sales demand. For baking and drying operations, the modern Fostoria Infra-red Oven provides an array of cost-saving, quality-improving advantages. By far the most efficient of all industrial ovens, as thoroughly proved in over 7,000 plants, Fostoria gives the most productive output to energy input, PLUS the greatest production in the least space, PLUS the fastest time cycle, PLUS automatic control. For lowest "per piece" production cost, for finest quality baking, for the competitive efficiency of your plant, compare your present equipment. The expert on-the-job assistance of a Fostoria field engineer is promptly available to you without obligation.

SEND FOR COMPLETE FACTS
Write for this brochure of technical facts and case histories of many Fostoria oven installations. Tell us your particular problem and we will include data directly applicable to your operation.

INFRA-RED fostoria OVENS

THE FOSTORIA PRESSED STEEL CORP.
Fostoria, Ohio, Dept. F

Please send information on ovens for

_____

Name_____

Company_____

Street_____

City_____ State_____

Bathtub, sink, cabinet production at Kaiser

→ *from Page 21*

been installed and plans are underway for the production of any desired pattern of graining in either white or colored enamels. Typical grainings will include mother-of-pearl and various wood grains.

AIRCRAFT COMPONENTS

Another important activity of the KMP commercial division is the production of airplane parts for the aircraft division. A battery of drop hammers cold-work aluminum sheets into intricately-designed airframe components, and two stretch-forming presses which, as their name suggests, actually stretch the metal to attain shapes which otherwise would be difficult to produce *(see "Modified Brake Used in Stretch Forming", September, 1950,* finish).

Some 6000 different parts for F-84F fuselages and B-57 wings are manufactured in the commercial division.

One of the largest presses in Plant 1 is a 2500-ton hydraulic press which dispenses with the usual set of male and female dies. The press ram carries a neoprene rubber blanket which slowly descends to force the metal down and around the dies. The rubber blanket is 9″ thick, 46x91″ in area, and weighs 2310 lbs.

Among other diversified products are aluminum wing tip fuel tanks for jet aircraft. As a "leak test" for these tanks Freon gas under pressure is pumped into each tank and a gas detector (snifter) is used to locate any possible leaks.

Freezers of the type used to store frozen foods are used for rivets and small parts which have been heat treated. These items tend to "set" at room temperatures but their forming qualities are retained if they are kept at low temperature. They are not taken from the freezers until ready to be used. Large parts are kept in a walk-in type of freezer.

As the latest addition to the company's commercial activities KMP just recently took on additional production in the form of finishing "glass lined" water heater tanks which are fabricated elsewhere. *(See page 81.)*

Producing ironing boards at Arvin

→ *from Page 34*

of the piece being sprayed. Both front and back coats are applied at less than the desired weights by the amount that will be picked up by the wraparound expected from applying the coat to the opposite face.

Ventilation for the spray booths is provided by an overhead air duct leading to the center of the circular chambers which acts as the only baffle or barrier for the booth. There appears to be so little overspray lost that elaborate precautions for handling are not necessary with this system.

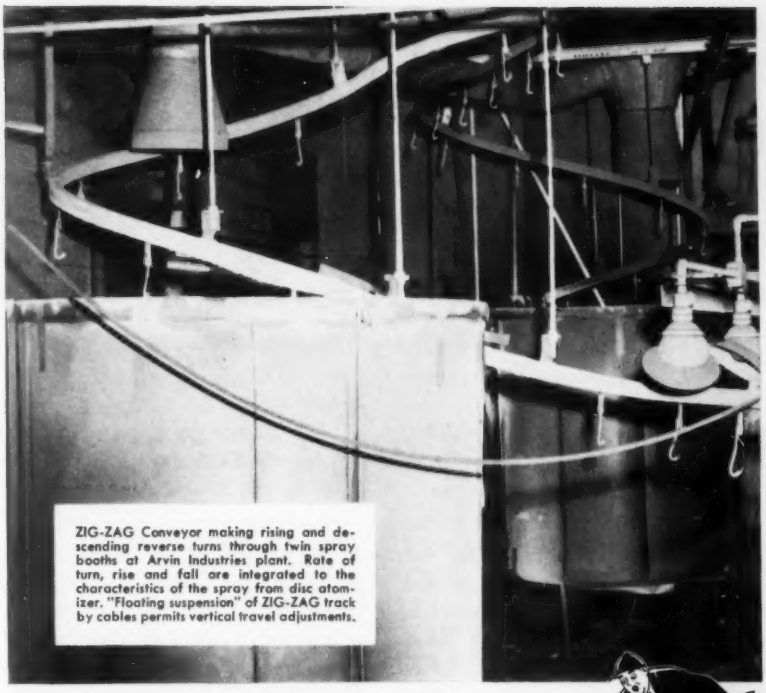
A short trip to the box car

The ironing board tops pass out of the spray room on the same conveyor on which they were sprayed and go into the bake ovens. They emerge on the next higher floor where they cool while traveling to an inspection station. Here they are labeled and pass on to the final assembly line, a canvas belt. The top is laid on this in an inverted position.

The front and rear leg assemblies and the longitudinal brace are attached by means of power driven wrenches and screwdrivers. At the end of the line, the boards are tested for functioning and rigidity, and placed on a cross-feed conveyor.

The cross-feed conveyor carries the board into the packaging room where it is inserted into its corrugated carton and placed on a slat-type sealing and labeling conveyor which is wide enough to accommodate the carton crosswise. This machine-conveyor combination applies adhesive to the flaps of the cartons, folds and supplies heat and pressure to the package as it moves through stations where labeling of several kinds are performed, all automatically, the parts tip on end and slide down a chute into a waiting box car or into a storage area, also automatically.

As stated in the beginning of the article, the boards are still warm from the bake ovens when they come to rest, fabricated, painted, assembled, packaged, labeled, and stored, ready for the trip to the housewife.



ZIG-ZAG Conveyor making rising and descending reverse turns through twin spray booths at Arvin Industries plant. Rate of turn, rise and fall are integrated to the characteristics of the spray from disc atomizer. "Floating suspension" of ZIG-ZAG track by cables permits vertical travel adjustments.

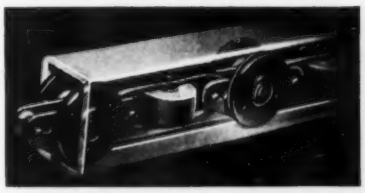
it's a hit...

with ZIG-ZAG's curves!

When there's a problem in electrostatic spraying, it's likely a Richards-Wilcox ZIG-ZAG® Continuous Power Conveyor will supply the answer—and cut production costs, too! That's the story at the North Vernon, Indiana, plant of Arvin Industries where metal ironing boards are automatically sprayed by disc atomizers.

With ZIG-ZAG's extreme flexibility, smooth motion, and precision speed control, it was no trick to lay out the helical curves and precise speed of travel essential to uniform coatings. And, in addition, through savings effected, the ZIG-ZAG installation can pay for itself within a few months.

With carrying pendants located on 6-inch centers, ZIG-ZAG is designed to handle any load a man can lift in continuous production. A choice of drive units permits travel at any required speed with variations of 10 to 1 or better. And ZIG-ZAG is easily altered, expanded or relocated by plant personnel, usually without waste of a single part!



Due to unique chain design, ZIG-ZAG travels "just like water through a pipe".

For any production-flow or handling problem, think of ZIG-ZAG—call the nearest R-W office for details.

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Evaluation of performance for appliance controls

a three-part article describing techniques and devices for testing control components

PART III

by George C. Pearce • RANGE ENGINEERING SECTION HEAD, FRIGIDAIRE DIVISION, GENERAL MOTORS CORPORATION, DAYTON, OHIO

THE controls on washers and dryers do not need accelerated tests. Since 2000 running hours is considered adequate life for these devices, it is our practice to endurance-test the entire machine under load. By again running 24 hours per day, the test can be completed in 90 days. This is the ideal test for controls as the electrical loads are exactly right, and so are other conditions affecting operation — such as vibration, moisture, and temperature changes.

Before starting a 90-day test, it is well to determine that all controls are to specifications—discovery on the 85th day that they are not, results in the loss of a great deal of time. ***Figure 7*** shows a gadget for checking sequence of a washer timer, used as described for checking the control and analyzing in case of trouble.

Another good technique — on the border between engineering and quality control—is to provide as part of the facility for a new product, or new control, the best possible testing equipment. This equipment should have capacity to permit 100% checking in the initial stages, or as long as necessary to satisfy all concerned that the controls are "grooved in" and functioning as intended.

Figure 8 shows equipment of this type for testing dryer timers. ***Figure 9*** shows the dryer thermostat test, and ***Figure 10*** shows the dryer cut-out test oven. As the dryer is a relatively new product to our company, this equipment is used on 100% of the controls. Eventually we will resort to spot checking, but the high capacity equipment will always be available, just in case. This equipment is typical of that provided for all controls used on our products. We have found that extra vigilance on the controls during first production of new appliances pays off handsomely in avoiding later field trouble. It is easy to overlook the controls when concentrating on other features.

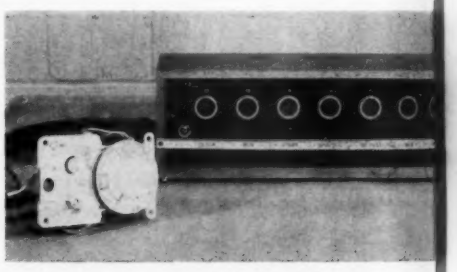
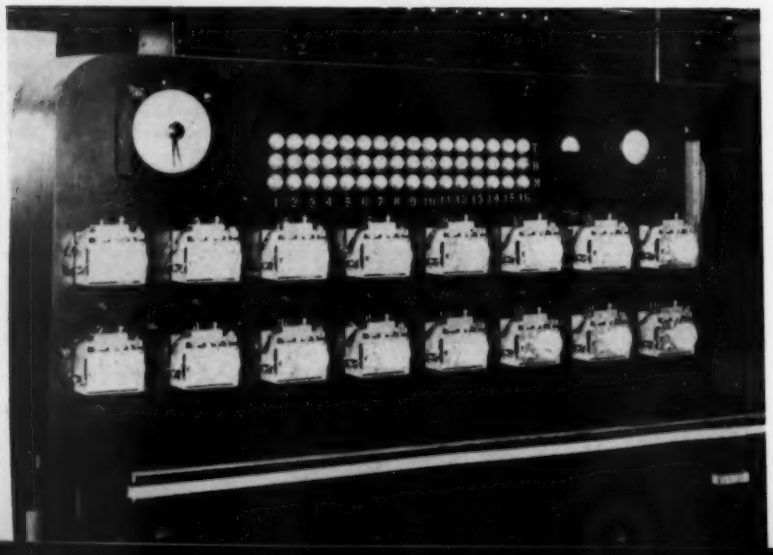


FIGURE 7

I cannot close my examples of a new product without reference to the C-7 pilot bulb. This is not exactly a control device, but is closely related. No criticism of the lamp makers is intended. The original C-7 was suited to its application on Christmas trees, but we, as well as others, used it as a pilot light on appliances because of cost and availability. We found the life very short—no where near the rated hours, and received numerous complaints from users. We verified, by our own tests, that the average life was as stated, and that frequent starts did not materially shorten its life.

We placed the problem before our suppliers who determined that the cause of the short life was filament breakage due to vibration. New designs were submitted to correct the trouble, and we tested these by mounting them in a range and slamming the oven door mechanically. The life—measured by cycles of slamming—was at least ten time better than cur-

FIGURE 8



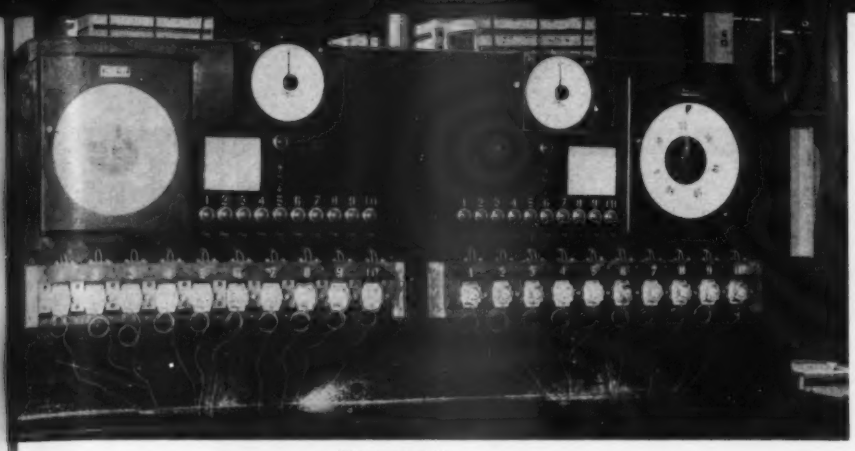


FIGURE 9

rent production lamps. Our company adopted the bulb 100% for 125-volt pilot use on new production. We also notified our service men and asked them to use the improved bulb for servicing older products—and we made it available. After several years, our pilot bulb complaints are nil. During the course of these events, which covered several years, I found that the method of door slamming had been used earlier to check suitability of lamp construction in refrigerators.

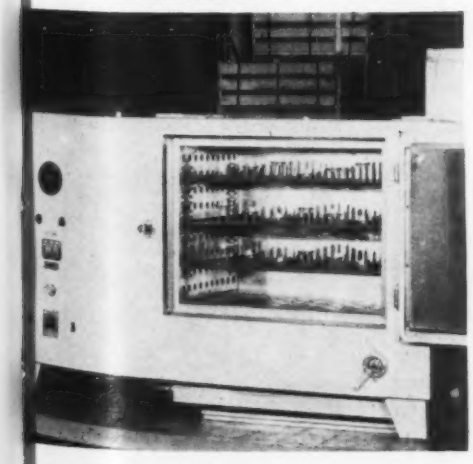
Figure 11 shows the machine we use today to rate various lamps for use on appliances. The entire battery of lamps is lifted by a cam and dropped on an anvil. The drop and anvil design were worked out by trial, to give the same lamp life as a range with the oven door slammed The lamps on test are turned on and off by a separate switch, not synchronized with the drop mechanism. This feature has a marked effect on the life. Assurance of long life is necessary where the bulb is not accessible for re-lamping, or where replacement bulbs are not readily available to the user. This machine is used to check all new designs.

The results from this test machine are usable only for comparison with tests from the same or a similar machine. Initially, the calibration was by trial. As mentioned earlier, it is wise to build a device of this type, and at least the first one should be sturdy enough to last for years. The sample shown has made millions of cycles without apparent wear. We have complete confidence in our evaluation of new lamps on this machine because of several years experience with it, and our correlated service experience.

Credit for the engineering, in this instance, belongs to the lamp designers. Our part was to show interest in an improved product, willingness to pay for it, and willingness to spend money for independent tests.

We have avoided discussion of the standard, or purchasable, instruments of all kinds which are common in the control industry, and which uses are well known. The special devices, of course, are auxiliary to the basic instruments and test techniques.

FIGURE 10



Qualifications needed for an appliance engineer

Securing and maintaining freedom in appliance controls is like keeping the water out of Holland. Engineers charged with the responsibility must have:

1. Skepticism to question the simplest detail—the perfect control has not yet been made.

2. Vigilance and experience to detect incipient trouble during development or early production.

3. Analytical ability to determine the real cause of control malfunction, or service complaint. Troubles correctly diagnosed are half cured.

4. Sufficient standard and special test equipment for their controls, and the perseverance to use it.

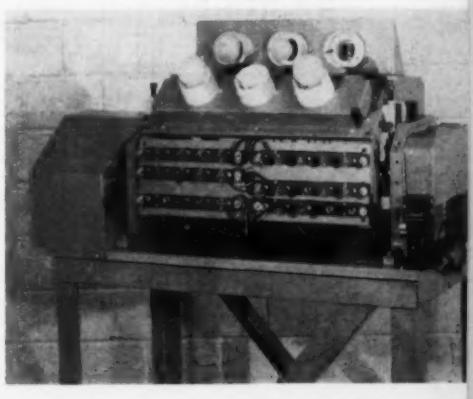
5. Patience to re-check changes made as a result of actual or presumed service trouble. Sometimes the cure is worse than the illness.

6. The ruggedness to put necessary changes into effect. Controls are usually banked ahead of the production line. If a weakness shows up in pilot, or early production, the question always arises whether it can be taken care of in stride, or if drastic measures need be taken. Within reason, the latter course is preferred. There is sometimes a tendency to be "penny-wise and pound-foolish" on control items.

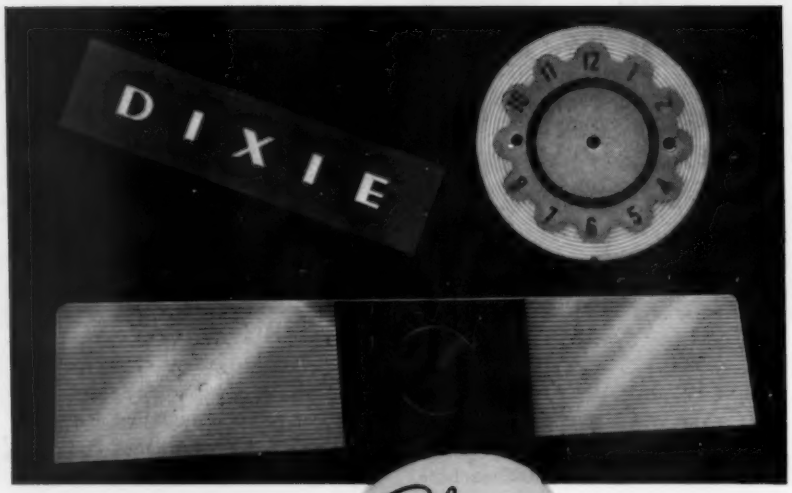
The majority of controls are subcontracted items, and practically 100% of them are made remotely from the production and final test lines. We have come a long way in improving their service record, but much still remains to be done. We need these designers and suppliers for the job. So, when something is found that needs improving or correcting, approach your supplier in a constructive manner. Control designers and suppliers should feel neglected if their customers are not suggesting objectives, or detail changes, to improve reliability.

Nearly 30 years as a control designer, application engineer, and complete appliance designer, has made me mildly fanatical on this subject of reliability. If some of it rubs off on *finish* readers, I think our industry will be helped.

FIGURE 11



Adapted from a presentation before an AIEE Appliance Technical Conference.



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MEETINGS

STOVE MFRS. MEETING, EXHIBIT

Institute of Cooking and Heating Appliance Manufacturers, annual meeting and suppliers exhibit, Netherland Plaza, Cincinnati, June 7-9.

PLASTICS EXPOSITION

Society of the Plastics Industry, exposition and conference, Public Auditorium, Cleveland, June 7-10.

PORCELAIN ENAMEL SYMPOSIUM

Alfred University, symposium on porcelain enamels, June 8-25, Alfred, New York.

QUALITY CONTROL CONVENTION

American Society for Quality Control, annual convention, Kiel Auditorium, St. Louis, June 9-11.

ASTM MEETING AND EXHIBIT

American Society for Testing Materials, annual meeting and exhibit, Sherman Hotel, Chicago, June 13-18.

MIT COURSE ON CORROSION

Massachusetts Institute of Technology, summer course on corrosion, Cambridge, Mass., June 21-25.

HOMEFURNISHINGS MARKET

Summer homefurnishings market, The Merchandise Mart and American Furniture Mart, Chicago, June 21-July 2.

HOUSEWARES, APPLIANCE SHOW

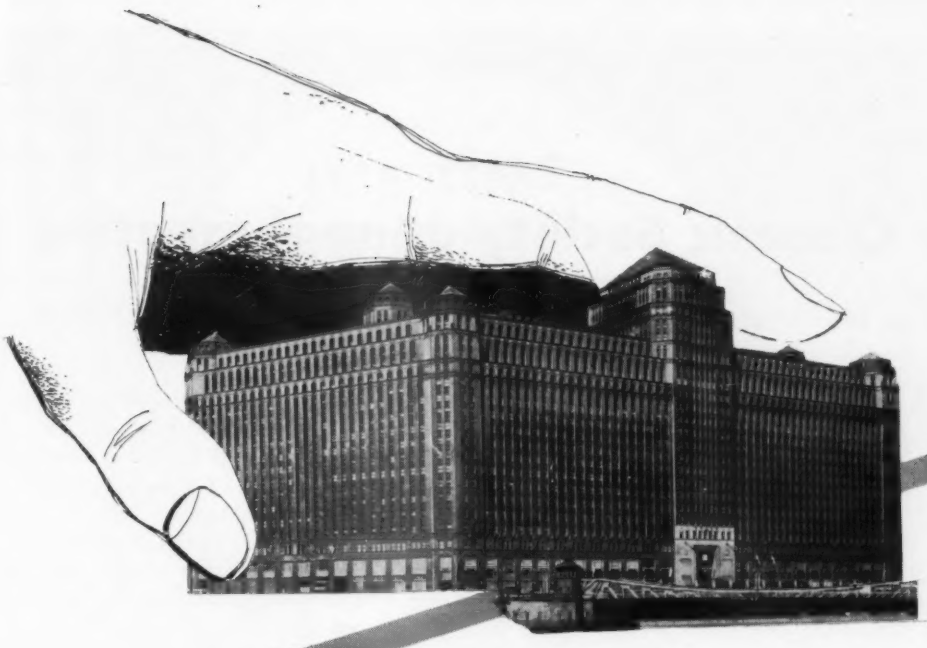
National Housewares Manufacturers Association, national housewares and home appliances exhibit, Auditorium, Atlantic City, July 12-16.

ELECTROPLATERS CONVENTION

American Electroplaters Society, annual convention, Hotel Statler, New York City, July 12-15.

HOME LAUNDRY MFRS. MEETING

American Home Laundry Manufacturers Association, summer meeting, Grand Hotel, Mackinac Island, Michigan, July 25-28.



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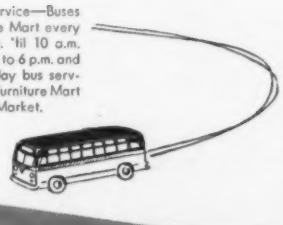

THE MERCHANDISE MART

American Ceramic Society annual meeting

Pafford installed as president of Society—McIntyre named Enamel Division trustee

THE Palmer House, in Chicago, was the site of the 56th annual meeting of the American Ceramic Society held April 19-22.

New officers

The slate of officers elected for the coming year includes: president, R. W. Pafford, Acme Brick Co., Fort Worth, Texas; president-elect, Robert Twells, Electric Auto-Lite Co., Fostoria, Ohio; vice presidents, Wm. O. Brandt, Gladdings, McBean & Co., Los Angeles; John M. McMahon, N.Y. State College of Ceramics, Alfred, N.Y.; Rolland R. Roup, Globe Union, Inc., Milwaukee; and treasurer, W. E. Dougherty, The O. Hommel Co., Pittsburgh.

The new president succeeds R. R. Danielson, of Metal & Thermit Corp., who is well known throughout the industry and particularly in the porcelain enameling field.

G. H. McIntyre, of Ferro Corp., was named trustee of the Enamel Division.

Enamel division sessions

The technical papers presented at the Enamel Division sessions may generally be divided into two classes: those adding further information to subjects previously reported, and those initiating essentially new subjects.

R. W. PAFFORD, ACS PRESIDENT

Adding to previous material — Existing information was augmented by papers on the subjects of stress and strain in porcelain enamel-steel systems, acid resistance (practices to improve), oxidation phenomenon, adherence, abrasion, and x-ray diffraction identification. These subjects increase the store of knowledge on the subject matter, and can be expected to be followed by others until the phenomenon of each is more completely understood.

New topics reported upon — New uses for porcelain enamel and an entirely new field was seen from the activities of the National Bureau of Standards in NBS work on ceramic coatings for nuclear reactors. Certainly if this material is appropriate for coating reactors, it offers promise as a building material where radiation factors are a consideration.

While cermets are not a strictly new subject, so little has been published *(see December 1953* finish, *and July 1954 issue)* that they may be considered essentially new. Information delivered was concerned with the wet process type of application and the fired characteristics of cermets applied in this manner.

A unique approach to the problem of stabilization of the set characteristics of enamel slips was employed by dry milling and then coating the frit with a silicone to inhabit solubility and the leaching of objectionable salts. This was not presented

to Page 70 →

Showing a section of the Enamel Division meeting room during technical session period.

IT'S TIME FOR PLAIN TALK
About
ENAMELING OXIDES
The trend to color is more in evidence every day. Home Decorating Editors are selling the homemaker color in the magazines she reads. Appliance and Architectural Manufacturers and Enamelers in following this obvious color demand by their customers must have an Enameling Oxide supplier that can furnish not only colors but years and years of color production experience, research and counsel. You get these essential answers at HOMMEL.
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*D-Enameling is a patented process
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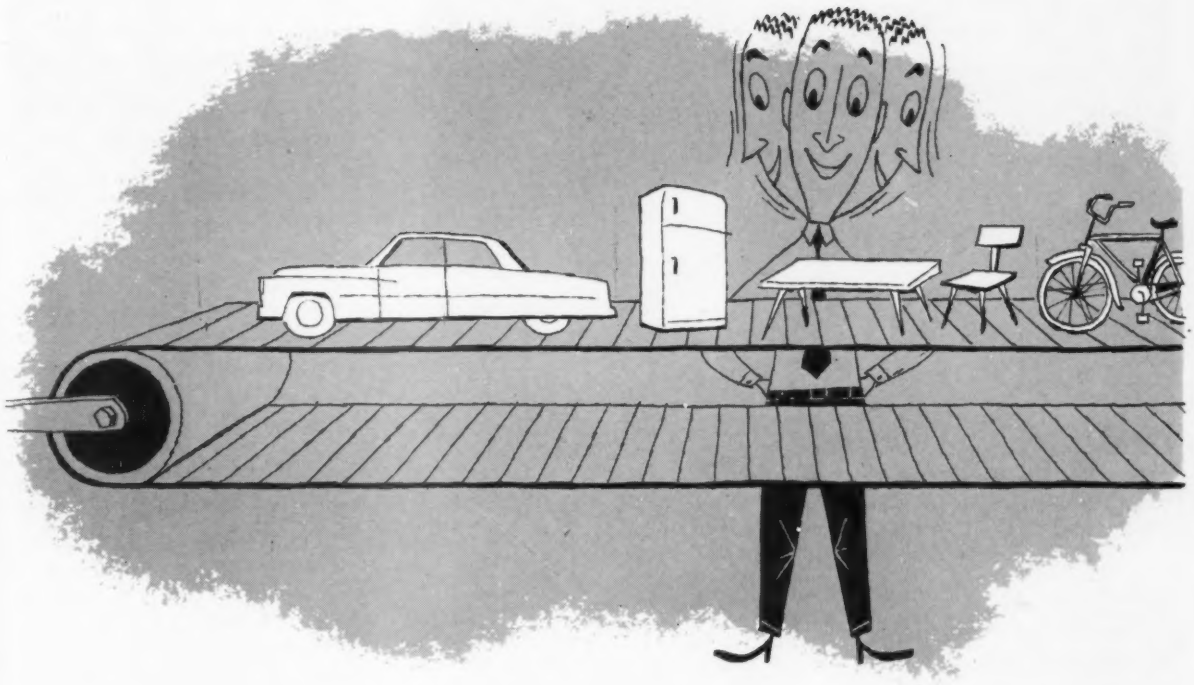

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At presentation of awards in Student Contest sponsored by Ferro Corp. are, left to right: Ben J. Sweo, of Ferro; N. F. Cerulli, of Rutgers U., 1st prize winner; and Robert E. Cowan and Herbert R. Toler, both of U. of Illinois, 2nd and 3rd prize winners respectively.

→ *from Page 66*

as a completed study but as the preliminary investigation to point out the desirability of such a study. Charts and graphs indicated the system possessed several advantages. Materials prepared with the silicone protection had: reduced weight loss on firing; less bubble structure; improved acid resistance, and equal texture. The success of this system would seem to indicate not only improved stability and handling conditions with presently existing enamels, but the additional latitude needed at present to make some of the softer formulations practical in the commercial shops. It may enable lower fusing material to become practical.

Color — Increasing interest in color, the instruments to measure and analyze it, nomenclature, effects, etc., seems to be commensurate with the growing interest at sales levels *(see* finish, *January, May, June, 1954)* to merchandise this sales aid. A whole afternoon was devoted to the subject. One event of interest was the exchange of attendance between the Enamel and White Wares Division by a large group of interested people.

Student contest awards

Winners in the 5th annual Student Contest in porcelain enamel technology, sponsored by Ferro Corp., were announced at the close of one Enamel Division session.

The $500 first prize went to N. F. Cerulli, a graduate student at Rutgers University, for his paper on "Electrophoresis in Jewelry Enameling."

Second and third prizes of $300 and $100, respectively, went to two University of Illinois students: Robert E. Cowan, a senior, for a paper on "Sonic Method for Measuring Young's Modulus of Elasticity of Porcelain Enamel-Metal Composites"; and to Herbert R. Toler, a graduate student, for his paper on "The Protection of Titanium Metal Against Embrittlement."

Awards of $50 each to the fourth and fifth place winners were presented to Frederick H. Simpson, a senior at the University of Washington, for his paper on "A Ground Coat Enamel for Titanium", and to E. C. S. Rao, of Narsapur, Madras, India, a graduate student at Pennsylvania State University for a paper on "An Evaluation of the Durability Tests for Enamels".

Ben J. Sweo, Ferro's director of ceramic research, made the award presentations.

Overflow crowd at luncheon of coordinating committee for district enamelers clubs

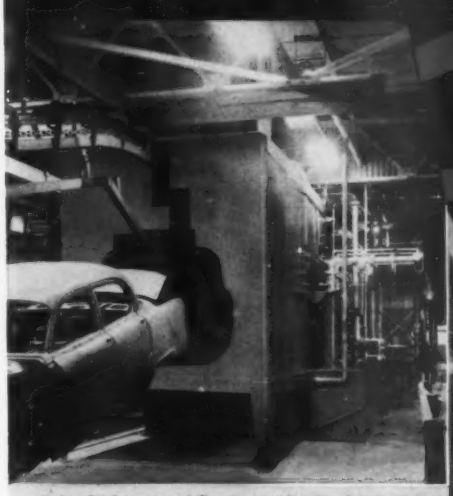
The popularity of the luncheon-meeting of the Coordinating Committee for the industry's four enam-

to Page 82 →

Showing another section of Enamel Division during technical session period.

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Mahon Six-Stage Metal Cleaning and Rust Proofing Machine. Note Modern Fire-Jet Heating Units on solution tanks.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Interior of one of the four Mahon Down-Draft Hydro-Filter Spray Booths in this Complete Mahon Automobile Body Finishing System. Note adjustable Diffusers in ceiling for better air circulation control within the booth.

One of three Mahon Dry-Off Ovens and one of five Mahon Cooling Tunnels in this Complete Mahon Finishing System.

Mahon floor conveyor type Finish Baking Oven in the two-tone and repair line—part of the same Complete Mahon System.

MORE AUTOMOBILES are FINISHED in COMPLETE MAHON FINISHING SYSTEMS than ALL OTHERS COMBINED!

Illustrated here is another Complete Mahon Finishing System installed for one of the world's largest producers of fine automobiles. Embodied in this system are all the latest developments in equipment of this type . . . it combines all the major units of equipment and other essential facilities into an efficient, smooth running production processing system which turns out the ultimate in fine finish. If you have a finishing problem, or are contemplating new finishing equipment, you, like thousands of other alert manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, co-ordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better for more economical operation over a longer period of time—a factor which should be carefully considered when comparing initial cost figures. Mahon will do the complete job on one contract . . . undivided responsibility for the entire system safeguards you against complications which may upset your production plans and subsequent schedules. See Sweet's Plant Engineering File for information, or write for Catalog A-654.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

what's NEWS *for you from* PEMCO

An important factor when you think of color...

COMPATIBILITY
between color and frit

You're going to hear a lot about compatibility because compatibility between color and frit is the ONE answer to color stability . . . color uniformity . . . color matching. You just can't use *any* frit and any color if you want perfect results . . . it just won't work. Perhaps you've tried it.

Pemco's engineers' recognition of this factor led to the development of Neowite 500—a frit that is completely compatible with Pemco Enamel Oxides. It is the FIRST acid-resisting frit that assures stable, one coat pastel colors.

We say Neowite 500 is new but—like all of Pemco's "new" products—it's been proved in volume production. You'll see the evidence in appliance dealers' showrooms all over the country.

Want to assure yourself a position in the trend to color and more color? Let Pemco match your desired colors and then schedule a trial run in your plant. Call direct for fast action . . . or talk it over with the Pemco sales engineer.

EXCERPT FROM PETE BUETTNER'S SALES REPORT . . .
As an old time enameler, I had been skeptical of the claimed advantages of the new roller quenched frits over water quenched.

I have watched it very closely in many different plants and I'm convinced it's better. For instance, I saw roller quenched frit lick a hairlining problem that had existed for years. Now I'm sold on it.

"The World's Finest" PORCELAIN ENAMEL FRITS • COLORING OXIDES • SCREENING PASTES • GLAZE FRITS • BODY & GLAZE STAINS • UNDERGLAZE & OVERGLAZE COLORS • VITRIFIABLE GLASS COLORS

WORLD'S FINEST PEMCO

BALTIMORE 24, MARYLAND

NEW DELTA PLANT ADDITION

Delta Heating Corp., Trenton, N. J., manufacturer of domestic and commercial furnaces, is enlarging its present plant over 50% to accommodate new products recently added to its line. This is Delta's first expansion in Trenton, where it originally located in July of 1951.

A. L. Nathan, president of Delta, states that increased volume of business necessitated this expansion, and with Delta's forthcoming entry into the cooling and commercial fields, they anticipate the need of another larger plant in 1955.

CORY APPOINTS EISENDRATH MANUFACTURING HEAD

J. W. Alsdorf, president of Cory Corporation, Chicago, manufacturers of Cory, Nicro and Fresh'nd-Aire appliances, has announced the appointment of David C. Eisendrath as plant manager to head all Cory division manufacturing operations. Eisendrath will undertake responsibilities previously discharged by E. C. Neuman, vice president, who has been named to direct planning and procurement.

MITCHELL HEADS CROSLEY, BENDIX MARKET DEVELOPMENT

H. J. Mitchell has been named market development manager for Crosley and Bendix Home Appliances Divisions of Avco Mfg. Corp., according to Parker H. Ericsksen, Avco vice president and appliances general manager.

Formerly director of sales training for Bendix, Mitchell resigned that post last fall to become assistant to the executive vice president of Eureka Williams Corp. He left that position to return to Avco.

HOUSEWARES MFRS. ASSN. RE-ELECTS OFFICERS

S. L. Hanssen, president of Hanson Scale Co., Northbrook, Ill., was re-elected president of the National Housewares Manufacturers Association at the annual meeting of the board of directors, at the Palmer House in Chicago, April 27.

C. M. McCreery, vice president of Revere Copper and Brass, Inc., Rome, N. Y., was re-elected vice-president, and W. E. O'Brien, general sales manager of Toastmaster Products Div., McGraw Electric Co., Elgin, Ill., was re-elected treasurer.

A. W. Buddenberg was named executive secretary for his 12th consecutive term.

The membership previously re-elected the following directors, each for a term of three years: Hanssen; J. J. Harding, president, Federal Enameling & Stamping Co., Pittsburgh, Pa.; and J. A. Kaplan, Joseph A. Kaplan & Sons, New York, N. Y.

AMERICAN AIR FILTER ENTERS HOME HEATING FIELD

American Air Filter Co., Louisville, Ky., has added baseboard radiation to its line of Herman Nelson heating and ventilating products. The new heating units mark the company's entry into the residential heating field and were designed for perimeter heating systems.

FOXX RESIGNS CONLON-MOORE POST, JOINS K. C. FIRMS

Bernard J. Hank, president of Conlon-Moore Corp., Chicago, has announced the resignation of John M. Foxx, vice president in charge of sales for the Moore Division, Joliet, Illinois.

Foxx resigned on May 1 to become an officer for the Selvend, Selectivend Corporations, of Kansas City, Mo.

SAYRE NAMED PRESIDENT, GEN. MANAGER OF NORGE

Judson S. Sayre, well known top executive in the home appliance field, has been named president and gen-

eral manager of the Norge Division of Borg-Warner Corp. and a vice president of Borg-Warner.

Sayre, for many years president of Bendix Home Appliances, Inc., succeeds George P. F. Smith, who has joined the B-W executive staff.

CENTRAL ENAMELERS ELECT NEW OFFICERS

At their last meeting of the season, the Central District Enamelers Club elected new officers, and listened to a report on "Electrostatic Spraying as it Applies to Porcelain Enamel", by Marcel Pouilly, of Illinois Spray & Equipment Co. The meeting was held May 7 at the Allerton Hotel, Cleveland, Ohio.

The new officers include: president, Rush S. Dale, Ervite Corp.; 1st vice pres., Wesley Reynolds, Erie Enameling Co.; 2nd vice pres., Herb Lindegger, Westinghouse Electric Corp.; 3rd vice pres., Bill Rohde, Enamel Products Co., sec.-treas., Mike Bozsin, Ferro Corp.

In addition, the following were appointed to the Club's steering committee: Frank Spence, Chicago Vitreous Enamel Product Co.; Frank Kulvman, Pemco Corp.; Blair McConnaughey, The O. Hommel Co.; and Ed. Davidson, Ferro Corp.

ANNUAL STOVE CONVENTION AND EXHIBIT, JUNE 7-9

The 22nd annual Convention and Exhibit of the Institute of Cooking and Heating Appliance Manufacturers will be held at the Netherland Plaza, Cincinnati, Ohio, June 7, 8 and 9.

June 7 will be given over to meeting of the board of trustees in the morning, with luncheons for the Marketing Research Advisory Committee and the Solid Fuels Division, followed by a management session in the afternoon.

June 8 will be devoted to the General Session in the morning, with the keynote address on "Business Responsibility to the Free Enterprise System." Following the general luncheon, a "workshop session" will be held, with Fred A. Kaiser, of Detroit-Michigan Stove Co., acting as moderator. The president's reception and banquet will be held in the evening.

June 9 will be given over to meetings of the Domestic Range Division, Gas Space Heater and Floor Furnace Division, and Oil Division including technical section.

ADMIRAL UPS MOOS, MORTON

Two new vice presidents have been elected at Midwest Mfg. Corp., Admiral's major appliance subsidiary,

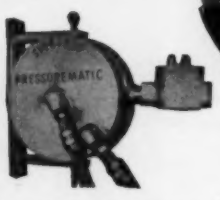
E. T. MORTON

SPEE-FLO Hot Spray
REDUCES FINISHING COSTS!

with Absolute Quality Control

Spray 2-Coats In One
Fewer Rejects!
One Standard of Quality
regardless
of plant temperature
or seasonal humidity

SPEE-FLO HOT-SPRAY HEATERS



Builders of practical industrial hot-spray heating equipment.

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For FIXED or
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Builders of practical industrial and automotive hot-spray equipment
Please send me information on your line of hot spray heaters best suited to our work. Type of products being finished.....
Application is conveyorized.....turntable.....mobile.....other.....
Average volume of material per gun per hour.....
Type of material.....Please have representative call.....
Name .....
Company .....
Address .....
City .....State .....

L. H. MOOS

Galesburg, Ill., it was announced by John B. Huarisa, executive vice president, Admiral Corp.

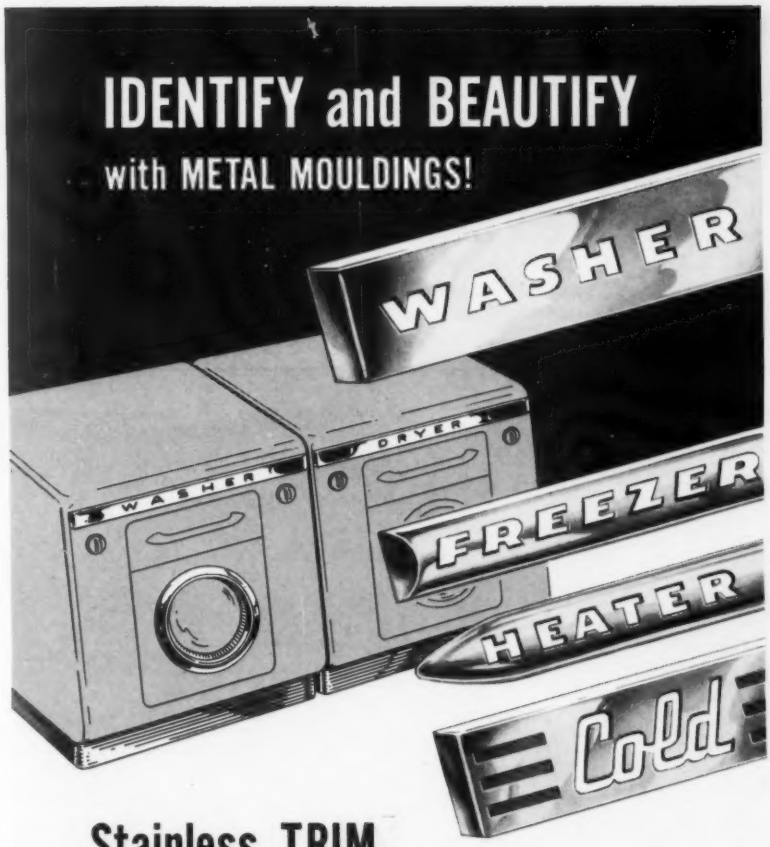
L. H. Moos, formerly general manager, is now vice president and general manager, and Evans T. Morton, director of engineering, is now vice president and director of engineering.

MAYTAG UPS ELY, MURRAY PAYNE; MARTIN RETIRES

Claire G. Ely, manager of product and market planning, has been appointed general sales manager for The Maytag Company, Newton, Iowa, it was announced by Roy A. Bradt, vice president - marketing. Ely succeeds Verne R. Martin who retired.

Succeeding to Ely's former position is A. B. Murray, who in turn is succeeded as general service manager by S. R. Payne.

C. G. ELY



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Decorative trim is as necessary for sales appeal as a brand name or product identification...Together, these offer a double benefit—and at less cost. Lettering or trade marks can be added to a wide choice of Pyramid standard sections...Debossed and paint filled or embossed and satin finished. Write or call today for more information on these beautifying and money saving combinations.

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No one connected with the design or manufacture of any appliance should be without a copy of this book containing hundreds of standard and special mouldings. Send for your free copy today.

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WHIRLPOOL ANNOUNCES REALIGNMENT OF KEY PERSONNEL

The appointments of Otto Krauss as general manager of the St. Joseph, Michigan, division, and William D. Fowler, as administrator of industrial and public relations, were announced by D. W. Alexander, vice president of operations, Whirlpool Corporation. Krauss was works manager at St. Joseph, and Fowler was assistant works manager.

Krauss' new duties include jurisdiction over production, quality control, purchasing, product engineering, industrial engineering, and factory costs and budgets.

Fowler's duties include the coordination of employee, industrial and public relations among the company's plants in St. Joseph; Clyde, Ohio; and LaPorte, Ind. Assisting him will be Glenn D. Clark, director of management development; Leslie V. French, director of training; and A. S. Hatch, director of public relations.

OTTO KRAUSS

WILLIAM FOWLER

Other appointments which apply to the St. Joseph division include: John Platts, formerly purchasing director, now works manager; Howard Liffick, previously director of industrial and public relations at LaPorte, now director of industrial relations; and M. R. Denison who just joined Whirlpool as director of purchasing from a similar position with Bendix Home Appliances Division of Avco Mfg. Corp.

These new appointments are part of a program of realignment of responsibilities and duties of key company personnel to provide a structure for more efficient handling of specialized functions evolving from the company's present multiple-plant operations.

1—Spray Painting

2—Dip Painting

3—Phosphate Coating

FINISHING

A VERY IMPORTANT PART OF NEW MONARCH'S

Complete-from-Blueprint-to-Shipping-Carton Service

Quality Finishing is a highly important factor in assuring a more durable surface for your metal products and in inhibiting corrosion.

New Monarch gives most careful attention to the preparation of the material to be finished. We have the equipment for handling most efficiently a wide range of finishes and the skill and experience to produce the one best suited to your particular requirements.

To round out our Complete Manufacturing Program, our services include designing, engineering, dies, jigs, tools, stampings, assembly, finishing, packing and shipping—whether for a completely packaged unit or only a single, component part of an assembly.

New Monarch engineers will be glad to check your requirements and to advise how our Complete From-Blueprint-To-Shipping-Carton Service can prove itself invaluable to you.

Write today for details.

NEW MONARCH MACHINE & STAMPING COMPANY

406 S. W. NINTH STREET DES MOINES 9, IOWA

Under the program Whirlpool plants in LaPorte, Clyde, and St. Joseph will operate as autonomous divisions, each under a general manager. Activities of a corporate nature affecting the individual plants will be coordinated by an administrative group.

NEMA ORGANIZES HOUSE HEATING EQUIPMENT SECTION

A new section has been added to the National Electrical Manufacturers Association with the recent formation of the Electric House Heating Equipment Section.

The scope of the section includes the following types of heating equipment: (1) Cable units for installation as radiant heating systems; (2) Radiant panels either of glass or other materials with, or without, integral component motors, thermostats, or other accessories; (3) Floor standing panels, or screens, which are adaptations of radiant panels listed under previous item, suitable for operation at voltages in excess of 200 volts; (4) Wall heaters, convection type, natural or fan-forced, suitable for operation at voltages in excess of 200 volts; and (5) Floor furnaces, baseboard panels, and electric steam radiators.

Non-member companies, whose application for membership in NEMA and affiliation with the new section were accepted, include:

Berko Electric Mfg. Corp., Queens Village, N.Y.; Ceilheat, Inc., Knoxville, Tenn.; Electrend Products Corp., St. Joseph, Mich.; Electric Heating Products Co., Phoenix, Ariz.; Federal Malleable Co., Milwaukee; Heatmore, Inc., New York City; Meier Electric & Machine Co., Inc., Indianapolis; Modern Cable Corp., Kingsport, Tenn.; Electric Heating Products, Inc., Knoxville, Tenn.; Electriglas Corp., Bergenfield, N.J.; Electromode Corp., Rochester, N.Y.; Pan American Electronics Co., Nashville; Sunwarm, Inc., Kingsport, Tenn., and Tennessee Plastics, Inc., Johnson City, Tenn.

Member companies of NEMA, whose requests for affiliation with the section were accepted, include:

General Electric Co., Providence, R.I.; Rockbestos Products Corp., New Haven, Conn.; United States Rubber Co., Passaic, N.J.; and Edwin L. Wiegand Co., Pittsburgh.

Officers of the section include: *chairman*, James E. Goff, vice president, Ceilheat, Inc., and *vice chairman*, H. O. Anderson, vice president-sales, Rockbestos Products Corp.

The program committee, consisting of F. T. Walsh, of Sunwarm, Stanley B. Aronson, of Berko Electric, and Robert E. Pequignot, of Electromode, will recommend a program of activities to be undertaken by the section at its first meeting to be held in June.

ILLINOIS ENGR. VICE PRES.

Illinois Engineering Co., Chicago, manufacturer of steam and hot water heating equipment, has announced the election of C. A. Pickett, general manager, as vice president.

Sell *all-over heating* at every setting, regardless of the controls you use!

Surface cooking is coming into its own in the new electric ranges now being readied for the 1955 market. And while range manufacturers may differ as to the special "controls" they use, more and more are offering *all-over heating* as a basic feature of their surface units. The reason for this is obvious: *women like the simplicity of operation, also the better cooking results they get.*

Cost-conscious manufacturers have been quick to realize the twofold advantages MONOTUBES give them. First, *all-over heating* at every setting, even with *standard* switches. Second, complete flexibility in selecting their "de luxe control" features (because MONOTUBES perform equally well with *all* of them). And how this does simplify your selling!

TK FERRO

TUTTLE and KIFT, INC.

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GEN. MILLS APPLIANCE DIV. BOUGHT BY MCGRAW ELECTRIC

Purchase of the home appliance division of General Mills, Inc., Minneapolis, by Illinois McGraw Electric Co., Chicago, manufacturing subsidiary of McGraw Electric Co., has been confirmed by Alfred Bersted, president of the subsidiary.

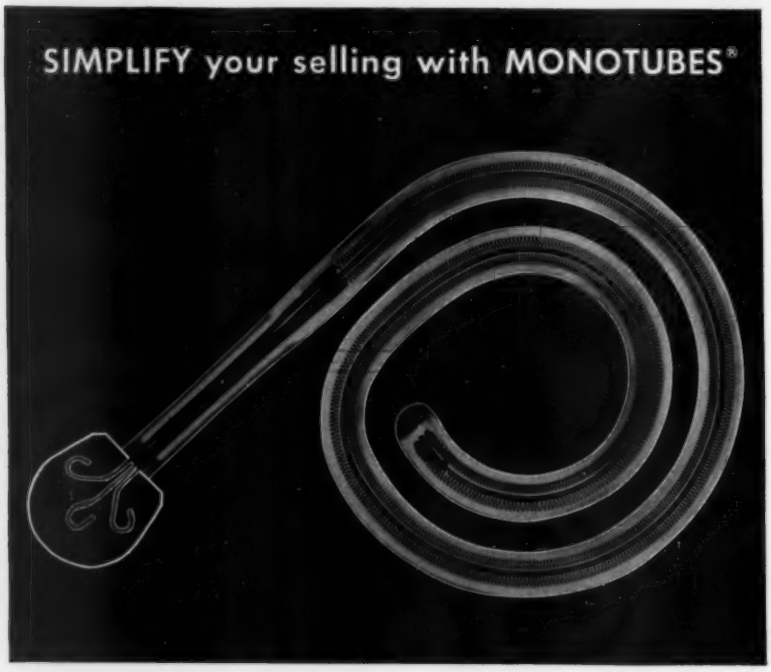
The division makes flat irons, mixers and electric toasters. It was indicated that McGraw will have use of the General Mills manufacturing facilities in Minneapolis until early fall.

LANDER ELECTED TO YOUNG PRESIDENTS' ORGANIZATION

Arthur M. Lander, president of Lawndale Enameling Co., Chicago. manufacturers of plumbingware has been honored by election to membership in the Young President's Organization.

The organization is national in scope with a total of only about 500 members throughout the country. These members are all men who have become presidents of their companies prior to reaching the age of 40, and whose company's sales are a million dollars or more a year. Lander has been at the helm of Lawndale Enameling since it was organized in February, 1946. He is also president of New Process D-Enameling Corp., Aurora, Ill., and a director of Industrial Radio Corp. of Illinois, Chicago, manufacturers of two-way radio communication units.

A. M. LANDER



Here's how you get *all-over heating* with low-cost 3, 5 or 7-heat switches!

This standard *3-wire* MONOTUBE is unique in that it is the only surface cooking unit that can provide 3, 5 or 7 heats in a single-coil heating element. This is, of course, the secret of all-over heating at every setting—and is made possible by the use of *two* helix of *unbalanced* wattage plus the usual return wire.

For instance, a 1450-watt, six-inch MONOTUBE delivers 1450, 800, 650, 362, 200, 160 or 90 watts with a 7-heat switch. This covers the whole range of surface cooking requirements while permitting you to use inexpensive standard switches for many units, and on *many models* in your line.

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PORCELAIN METALS UPS KLEINHANS, MC DONALD, PORTER, AND TURNER

P. B. McBride, president, Porcelain Metals Corp., Louisville, has announced the appointment of four

C. J. KLEINHANS

W. J. MC DONALD

vice presidents: C. J. Kleinhans, special administrative assignments; W. J. McDonald, responsible for engineering; W. T. Porter, direct supervision of all sales activities; and W. D. Turner, heading up manufacturing operations.

GILBERT RETIRES FROM FRIGIDAIRE

Retirement of Ellsworth Gilbert, Frigidaire's manager of appliance sales planning, after 25 years of service, has been announced by H. F. Lehman, general sales manager, who named J. K. Kay to the position.

MULLINS UPS WHITLOCK, HECKATHORN, SMITH, KROHNE, KNECHT, AND ALDERMAN

George E. Whitlock, president, Mullins Mfg. Corp., Salem and Warren, Ohio, since 1937, has been named vice chairman and chief executive officer, and is succeeded as president by Harry M. Heckathorn, formerly executive vice president.

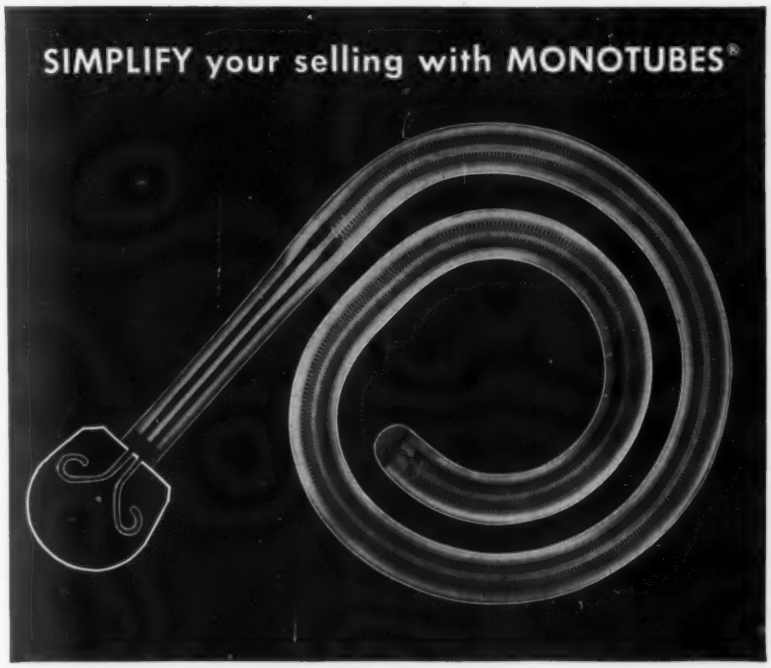
H. M. HECKATHORN

Three new vice presidents are Harold O. Smith, in charge of operations; Harry Krohne, also controller and secretary; and Frank W. Knecht, Jr., in charge of administrative planning, and also assistant secretary.

Expanded sales duties were given C. D. Alderman, formerly vice president of merchandising, who was elected vice president in charge of sales for the corporation. This covers the Youngstown Kitchens division, and the contract and Koldflo divisions.

SCRIPTURE, OF ING-RICH, DIES

A press date report tells of the death on May 4 of C. P. Scripture, 61, formerly vice president of Ingram-Richardson, Inc., of Frankfort, Ind. "Scrip" was born in Westport, Ind., and had been with Ing-Rich since its



MONOTUBES were made for *Infinite Control* ...perform perfectly with *Quick-heat* switches

This *2-wire* MONOTUBE has proved its mettle in hundreds of thousands of ranges over the past eight years. Like its 3-wire brother, it carries the heat over the full area of the unit, whether the whole electrical load or the barest fraction is desired.

Quickly responsive to changes in control settings, this MONOTUBE Unit is sufficiently sturdy to stand up under high temperatures for long periods, a feature that makes it ideal for use with "Quick-heat" switches, "Preheaters", special timing devices of all kinds. And you can literally "take your pick" of the new controls now available, as MONOTUBES perform superbly with all of them.

TK FERRO

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inception at Frankfort in 1916, until he retired in January 1952. He had been in ill health for the past several years.

RHEEM EXPANDS WATER HEATER PRODUCTION FACILITIES

Landis and Strobach added to "glass lined" water heater staff

Rheem Manufacturing Co., a leading producer of automatic storage water heater tanks and heaters, recently announced that it is adding facilities for "glass lining" water heater tanks in three plants — Baltimore, Chicago and Los Angeles. It was stated that deliveries in quantities of the new glass-lined water heaters and water heater tanks would begin during the second half of 1954.

George W. Landis, for 25 years with Vitreous Steel Products Co., Nappanee, Ind., has been named production manager for porcelain enameling water heater tanks in Chicago.

GEORGE W. LANDIS

Carl Strobach, ceramic engineer, has joined the company's staff at Southgate, Calif. He was formerly employed at Cribben & Sexton Co., Chicago, and Jones Metal Products Co., West Lafayette, Ohio.

The porcelain enameling division plant in Chicago, being erected by Ferro Corp., will have initial output at the rate of 200,000 finished tanks per year, according to a report.

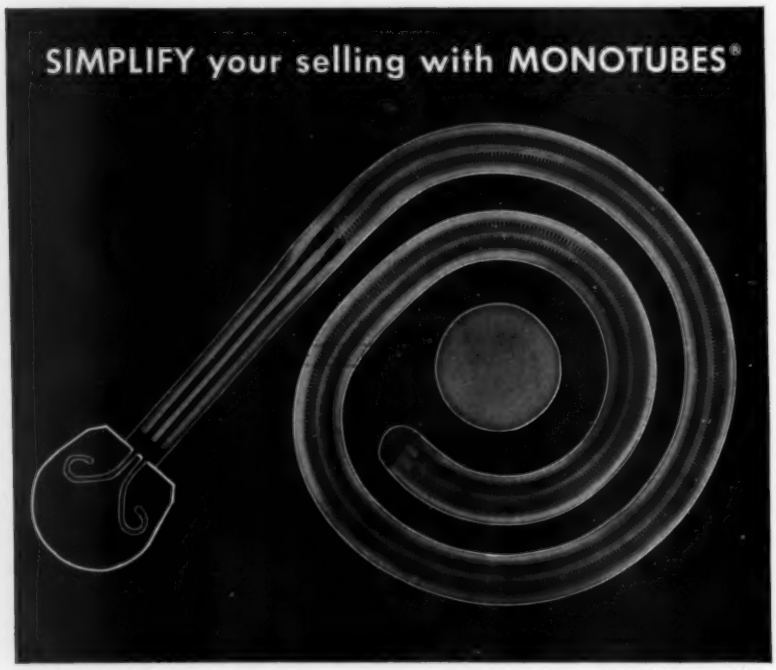
WATER CONDITIONING FOUNDATION HOLDS ANNUAL MEETING

Earl C. Reynolds, president, Reynolds-Shaffer Company, Detroit, was elected president of The Water Conditioning Foundation at the fifth annual meeting, held April 1-2, at the Edgewater Beach Hotel, Chicago.

James Lindsay, vice president and general manager, The Lindsay Company, St. Paul, was elected vice president, and John C. Hosford, Chicago, executive secretary and treasurer.

The remarks of outgoing president T. W. Bruner, at the opening business session of the two-day convention, gave a revealing picture of current sales and the huge market potential ahead, of which the industry has only reached the threshold.

Sales, Bruner pointed out, totaled 225,000 units in 1952, 265,000 units in 1953, and should top the 300,000 mark in 1954. This represents only six per cent of the total possible market, he added. The primary market consists of homeowners in rural and small towns in hard water areas.



You can use *"surface-contact"* controls, too, while going MONOTUBE across your line

Yes, you have the widest possible latitude in the selection of controls you use when you standardize on MONOTUBES across your line. And think of the advantages this gives you in (1) promoting your whole line, (2) educating and training your selling people, (3) "selling up", from model to model, on the retail sales floor, (4) building brand identification among future buyers of electric ranges.

There are advantages, too, in manufacturing when you standardize on MONOTUBES. You can change "control features" almost at will, to meet competitive conditions. And your labor costs will be lower. Can you afford to pass up all these benefits?

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KAISER ENTERS "GLASS LINED" WATER HEATER FIELD

Kaiser Metal Products, Inc., of Bristol, Penna., operating one of the country's large vitreous enameling plants, has announced its entry into the field of "glass lining" tanks for water heater manufacturers.

S. D. Hackley, vice president and general manager, said the company has arranged with one heater manufacturer to apply the glass-like lining to a substantial number of heater tanks and negotiations are underway with others.

"We expect a continuing increase in the volume of this business for two reasons," stated Hackley. "In the first place, public acceptance of, and demand for, glass-lined water heaters is growing steadily. Secondly, our equipment is modern and our capacity is large, making us particularly fitted to process the tanks."

This new work for KMP's enameling plant will be in addition to the present production of a wide range of porcelain enameled steel sinks and bathtubs and other sanitary ware, and synthetic enameled sinks, base and wall cabinets. These products are sold to various merchandising outlets.

The vitreous coating which is being applied to the steel water heater tanks at the KMP plant was developed in their laboratory *(which is equipped with a complete pilot plant)* in cooperation with suppliers of enameling frits. They formulated a glass-lining material which is highly resistant to alkaline substances as well as acids in water. This type of lining, besides preventing the formation of leaks, due to rusting, also serves to keep down the over-all weight of the tanks, as compared to stone-lined tanks, which are also widely used.

"Ten-year" accelerated service tests

In accelerated tests conducted by the firm for which KMP is processing the tanks, the lining was subjected to attack by various solutions at a rate equivalent to 10 years of normal usage, without damage to the tank.

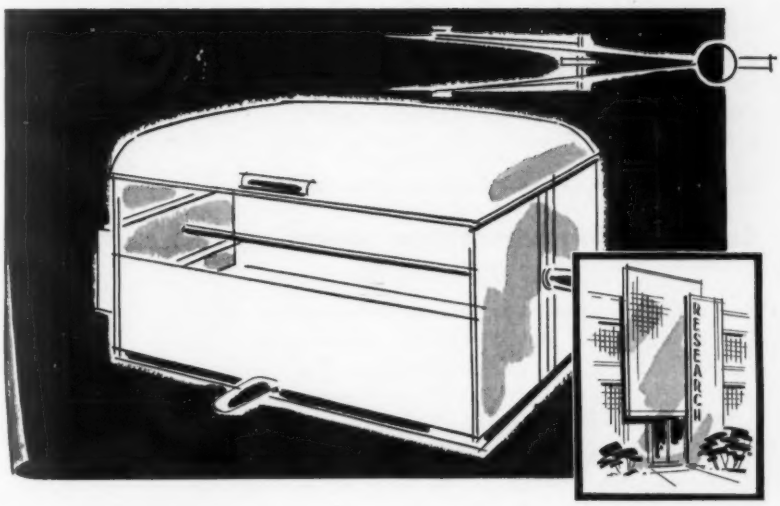
The hot water tanks are received from the fabricator as two assemblies, one being the shell and the top head welded in place, and the second being the bottom and the flue welded together. The assemblies are shot-blasted to remove scale and foreign particles. The diamond-shaped shot also etch into the metal to provide a suitable base for the glass enamel.

Exteriors get thin coat to prevent scale during firing

The shell and head assembly is coated by "sloshing" and the bottom-flue assembly by spraying. The exterior surfaces are given a thin sprayed coat which prevents the formation of scale on the steel as the parts move through the firing ovens.

The assemblies first move through a drying oven, then are placed on racks on an overhead conveyor line which carries them through the 80-foot furnace where they are fired at a maximum temperature of 1575-1585° F. It requires about 45 minutes for an assembly to pass through the furnace. →

to make it **safer** and **cooler** to the touch . . .



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*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for products made of or with fibers of glass.

With its present equipment, Kaiser Metal Products has a capacity of approximately 31,000 glass-lined tanks per month, based on an 8-hour shift, 5-day week.

KARL TURK, SR. — PIONEER LEADER IN THE PORCELAIN ENAMEL INDUSTRY — DIES

Karl Turk, Sr., co-founder and chairman of the board, Pemco Corporation, Baltimore, died April 18. He was born in the mountain village of Mohra, Germany, in 1882.

Since 1903, the story of his life closely parallels the development of modern porcelain enameling. After working seven years in the plant of a manufacturer of enameled signs, he and his brother Heinrich established in 1910 the Porcelain Enamel & Mfg. Co. (now Pemco).

Not content with his development of commercial frit and formation of a company to manufacture it, Mr. Turk and his brother designed the equipment and supervised its installation in the first enameling plant in a private factory.

In other instances, sites were sought, and personnel trained at Pemco to operate the plants. Many of today's well-known enameling companies, and many of the industry's best-known figures got their start at Pemco under the late Mr. Turk.

He is credited with developing much of today's technology and the designing of such equipment as the first speed fork, the first spray booth, the first spray gun, among others. In 1920, he originated a "standard consistency test." He was author of "The Ready Remedier" — a collation of pamphlets and leaflets developed over a period of years. The book has been revised and compiled several times and translated into foreign languages.

KARL TURK, SR.

He was made a Fellow of the American Ceramic Society in 1931, and in 1940 the National Association of Manufacturers named him one of the "modern pioneers" of the year.

His associates say he never stopped thinking and working on ways to improve quality, technology and results.

His three sons, Richard, Herbert and Karl Turk, Jr., are all officers of Pemco Corporation.

Coordinating committee meets at ACS convention

(Continued from Page 70)

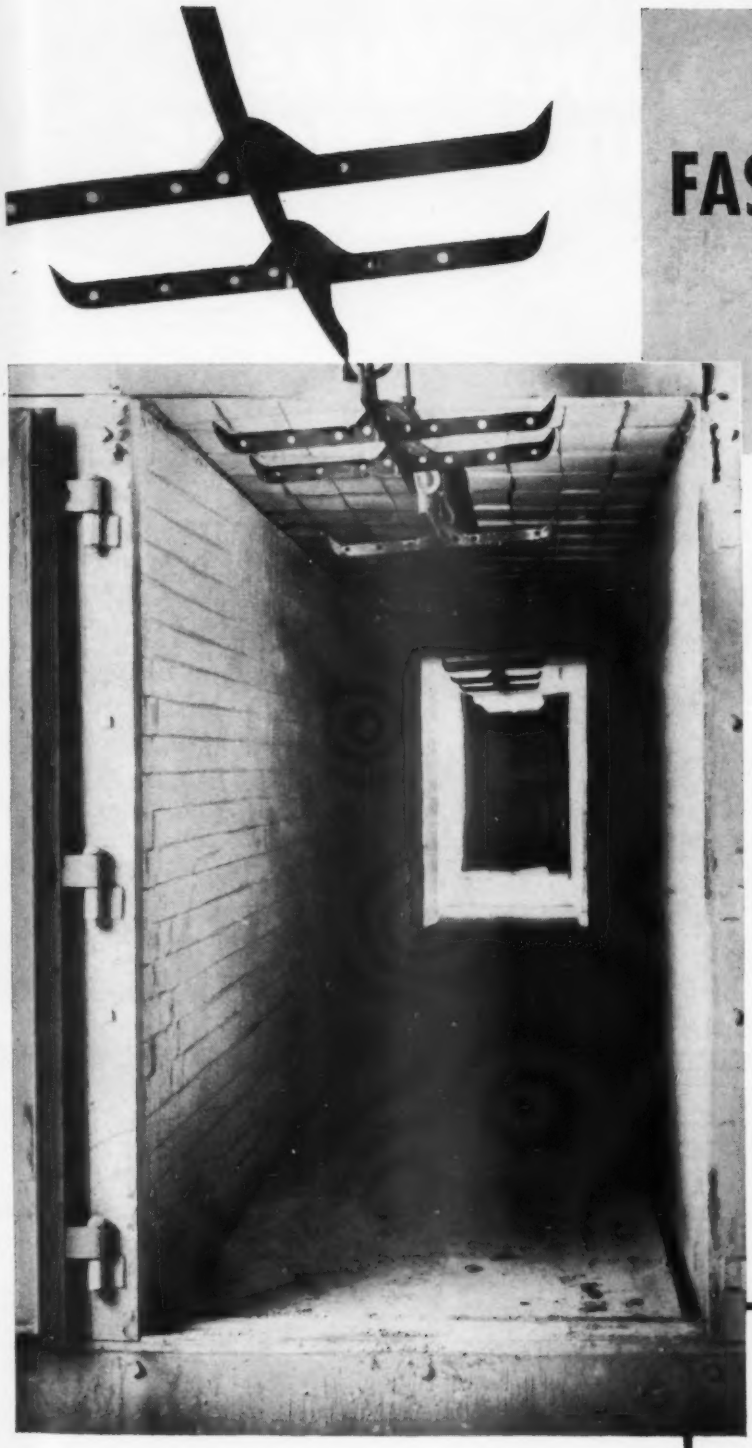
elers clubs was reflected by an overflow crowd which necessitated the hasty installation of an auxiliary table.

The purpose of the meeting is to coordinate the activities and dates of enamel club meetings so as to reduce schedule conflicts and to facilitate the exchange of speakers, programs and ideas.

This luncheon is open to all interested enamelers in addition to representatives of the four enamelers clubs, the Porcelain Enamel Institute and the American Ceramic Society.

Clockwise: F. W. Nelson, of A. O. Smith; J. H. Giles, PEI; Geo. Warren, Pfaudler; LeRoy Williams, Seeger; Robert Forth, Florence Stove; Walter Fenton, Lithium; Robt. Patrick, Pemco; Chas. Fleming, Industrial Enameling; D. E. Garen, Bur. of Ships; J. M. Zander, Chicago Vit; Roy Beck, Binks, R. L. Fellows, Century Vit; E. W. Dietterle, Ferro.

Clockwise: J. G. Wurtz, Pacific Coast Cer. News; M. L. Pouilly, Ill. Spray; J. L. McLaughlin, finish; *Lew Farrow, Whirlpool; M. B. Gibbs, Inland Steel; W. J. Plankenhorn, U. of I.; E. E. Marbaker, Hommel; M. E. Heuertz,* finish; *Rud Porter, U. S. Steel; Joe Baker, Harvester; B. T. Sweely, ChiVit; Geo. Tuttle, Benj. Elec.*



FOR FAST, UNIFORM HEAT TRANSFER

It's a striking sight to look into a furnace equipped with a CARBOFRAX® silicon carbide muffle. The entire muffle area radiates heat uniformly with no temperature differential apparent.

It's also interesting to see a fast acting furnace like this shift from one operation to another. Here, for example, they switch from enameling stove parts at 1560 F to TV cones at 1620 F — and the changeover is almost instantaneous.

But what is most significant about this muffle is not that it is silicon carbide — or even that it is *our* silicon carbide — but that our engineers worked with the operator in *applying* these refractories.

Actually, *three different super refractories* are used in this furnace. Each has its place. Each does a particular job. And their *combined* properties make a furnace that gives optimum performance and service.

Frankly, if you use super refractories, we think it makes sense to enlist the experience of the World's largest manufacturer of these highly specialized materials. If you have any problems, we'll be pleased to make recommendations. We invite your inquiries.

The muffle in this furnace has CARBOFRAX® sidewalls, and an ALFRAX® aluminum oxide bottom. The support arches and pierfacing are made of MULLFRAX® electric furnace mullite.

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Perth Amboy • New Jersey

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effective July 1, 1954

The new location is only two minutes from the Chicago & North Western R. R. Station — one block from the local U. S. Post Office — ten minutes from the local airport (helicopter mail service) — twenty minutes from O'Hare Feld (future Chicago International Airport) — one and a half miles from one spur of the future Congress Street Superhighway — within one mile of four existing east-west highways — approximately one half the former distance to the printing plant.

Visitors may reach the Elmhurst National Bank building by C&NWRR (twenty-five minutes on best trains from Chicago). Recommended route by car is Washington Blvd., Route 45, St. Charles Rd., York St. — approximately eighteen miles from Chicago's loop.

● *Proper address after July 1, 1954:*

DANA CHASE PUBLICATIONS
ELMHURST NATIONAL BANK BUILDING
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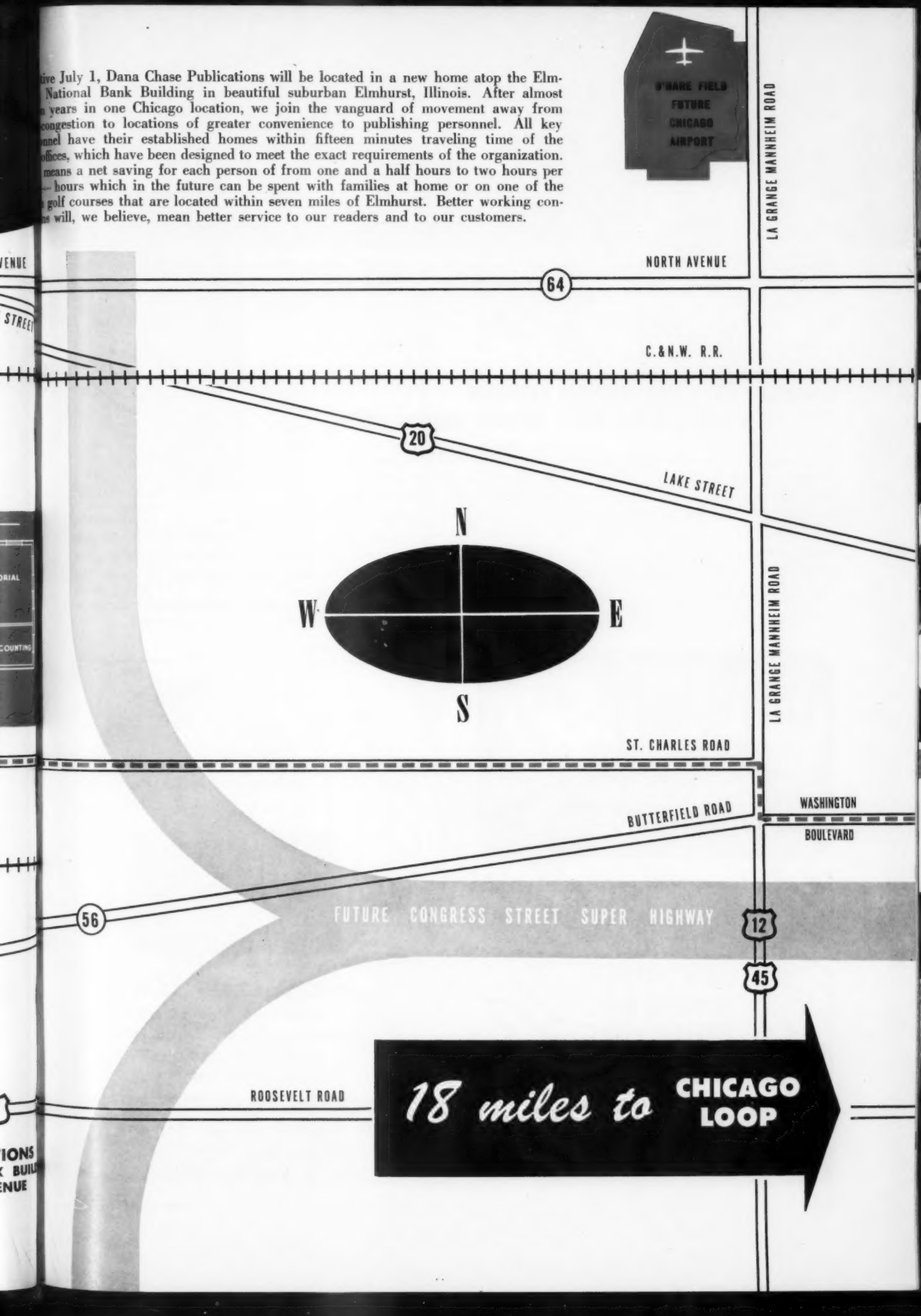
ELMHURST, ILLINOIS

TELEPHONES: Terrace 4-5280 and Terrace 4-5281
(Temporary numbers prior to August 1: Elmhurst 9705 and 9706.)

tive July 1, Dana Chase Publications will be located in a new home atop the Elm- National Bank Building in beautiful suburban Elmhurst, Illinois. After almost n years in one Chicago location, we join the vanguard of movement away from congestion to locations of greater convenience to publishing personnel. All key nnel have their established homes within fifteen minutes traveling time of the offices, which have been designed to meet the exact requirements of the organization. means a net saving for each person of from one and a half hours to two hours per — hours which in the future can be spent with families at home or on one of the golf courses that are located within seven miles of Elmhurst. Better working con- ns will, we believe, mean better service to our readers and to our customers.



Participating in panel discussion on kitchen planning and the use of steel cabinets were, left to right: Maxine Livingtone, Parents' Magazine; Sally Robb, McCall's; Bernice Strawn, Woman's Home Companion; Charlotte E. Conway, House Beautiful; Edith B. Evans, Living for Young Homemakers; Helen Kendall, Good Housekeeping; C. A. Reinbolt Jr., chairman, SKCMA sales promotion and advertising committee; Edith Ramsay, American Home; Elizabeth Burris-Meyer, House and Garden; Margaret Davidson, Ladies' Home Journal; Helen Stark, Better Homes & Gardens; and Jane B. Cornish, Good Housekeeping.

CONSUMER EDUCATION PROGRAM LAUNCHED BY STEEL KITCHEN CABINET MFRS.

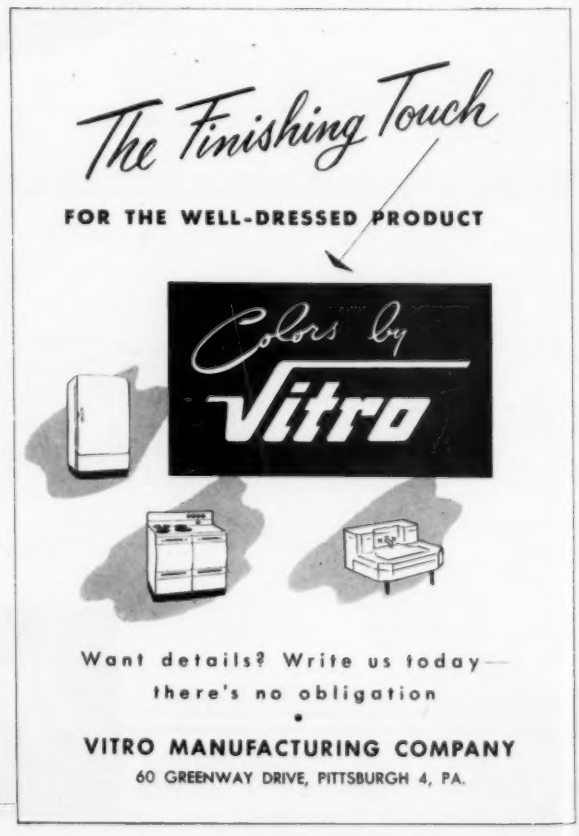
To acquaint home builders and modernizers with the contribution of steel cabinets to attractive efficient kitchens, the Steel Kitchen Cabinet Manufacturers Association has launched a consumer education program reaching into every section of the United States.

Announced at SKCMA's last quarterly meeting, the program was scheduled to receive additional attention at the Association's annual meeting in White Sulphur Springs, W. Va., May 27-29.

While the program is directed principally to families planning investments in new homes or modernization of existing structures, it also includes the supplying of information, diagrams, pictures and other material of interest and value to architects and builders.

Newspapers, national magazines, the trade press, radio and television stations are being supplied with authentic information on kitchen planning with cabinets of steel. The

to Page 91 →



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If you are now manufacturing a product or developing a product where you need motion at slow speed, here is the motor for you. Hundreds of thousands now in use on cooking appliances, vending, coin operated, amusement, and advertising displays.

These AC gear motors are precision built and are being manufactured in volume for immediate delivery. For further information, send the requirements of your application to us. Special motors are built to meet your new product needs. Write today for data sheet.

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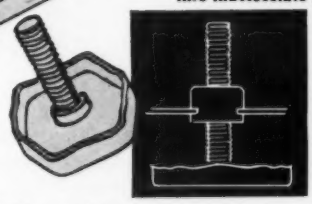
FOR LOWER COST "FIXED" FASTENINGS IN BLIND ASSEMBLIES

GRIPCO "CLINCH" NUTS

This is how leading appliance manufacturers get lower cost fasteners into inaccessible places.



←Cross-Section view after pilot has been clinched and bolt inserted. Can be locked at any point. (Non-locking nut can be supplied if preferred.)

For "hard to reach" places a Gripco "Clinch" nut holds tighter, wears longer, reduces mechanical failure for greater customer satisfaction. Provides added threading depth for applying bolts to thin metals. Holds product rigid in its container during shipment and holds the adjustable "levelers" tight for product installation and use. Used by leading appliance manufacturers.

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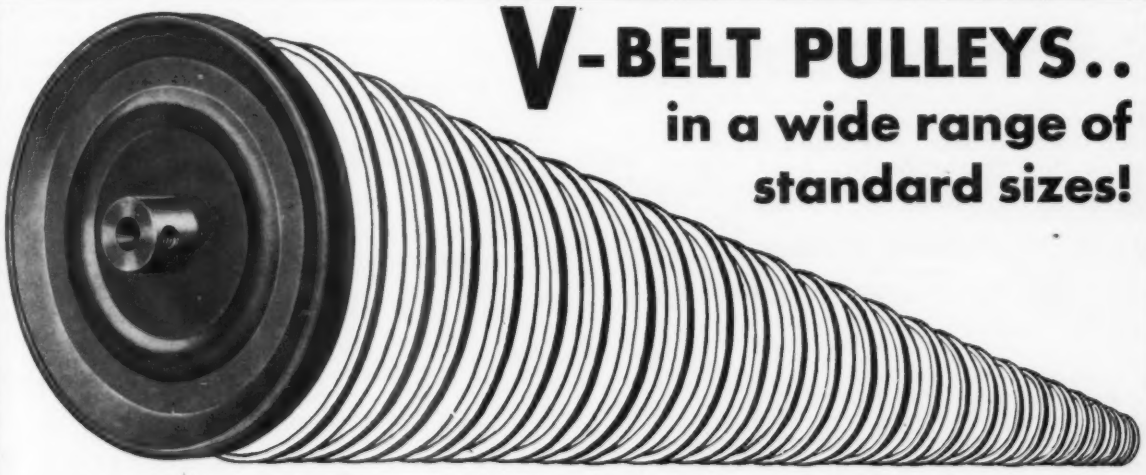

NAGEL-CHASE CASTERS for YOUR MOBILE APPLIANCES ARE AVAILABLE IN SIZES AND STYLES TO SUIT YOUR NEEDS!

When you need pulleys for your automatic washers or dryers, consult Nagel-Chase. With a wide range of sizes available, ranging from 2-5/16" O.D. to 14" O.D., the probabilities are that just the size you need is available. Of course, if your quantities required are large enough to warrant it, these specialists in V-Belt pulley manufacture can produce any size you need.

Nagel-Chase pulleys are precision-built of welded pressed-steel with solid steel hub . . . light-weight and designed for long, trouble-free service.

Whatever your requirements in pulleys or casters, consult Nagel-Chase first.

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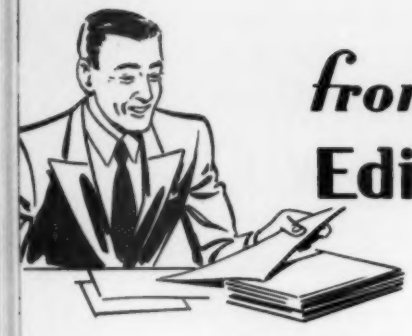
SPECIALISTS IN CASTERS AND PULLEYS FOR NEARLY A QUARTER CENTURY!



from the Editor's Mail

1944 10

Your magazine is one of the best that we receive. We appreciate receiving it and look forward to every issue. Keep up the great work.

R. H. Whitehurst
Purchasing Agent
James Incorporated

We like *finish* very much because of its excellence of reproduction, its authoritative information and comprehensive coverage. I send my copy through our plant, routing it to key people.

William P. Brotherton
Ryan Aeronautical Co.

We look forward each month to receiving your publication, and it is one of the several magazines I review from cover to cover and pick out the items of interest.

We have received a lot of desired information and help from your publication. I wish to thank you for forwarding *finish* to us ever since you have been in publication.

Leonard E. Bilger
President
Prizer-Painter Stove Works, Inc.

I have seen every issue of *finish* from the first copy. The magazine has improved steadily in every phase of your coverage. It is a most valuable publication. Many thanks for including my name on your mailing list.

Paul E. Davis
Production Manager
Chambers Corporation

Thank you for sending me *finish* for these many years. Of all the trade magazines that cross my desk, yours is outstanding.

Robert McEvoy
Research Engineer
Owens-Corning Fiberglas Corp.

Like *finish* magazine very much. It's very informative of what some of the other industries are doing. By comparing their ideas with our own we are able to cut corners.

Ed Schneider
Paint Superintendent
American Kitchens Div.
Avco Manufacturing Corp.

Of all the magazines I have an opportunity to read, *finish* is one of the two most appreciated.

A. Osse
Quality & Production Engr.
General Electric Company

I would like to take this opportunity of saying that I enjoy *finish* magazine very much, and find such special features as the Suggestion Box most interesting.

R. H. Greene
Major Appliance Dept.
General Electric Co., Ltd.

finish is one of the finer magazines in the industry. It has good up-to-date news of materials, developments and people. It's the one magazine I take home and relax with.

J. A. Disario
Finishing Foreman
Smoot-Holman Company

finish is an excellent magazine. You do a good job in covering both productive and technical developments.

Forrest W. Nelson
Research Department
A. O. Smith Corporation

We are particularly interested in *finish* because of its coverage of laundry equipment and AHLMA. It is a fine trade magazine.

C. G. Manning
Asst. Chief Engineer
Packard Electric Div., GMC

ANNIVERSARY YEAR 1954

I consider *finish* the finest trade publication of its kind in the country.

John H. Watson
District Manager
Despatch Oven Co.

Just a few words to emphasize my appreciation of *finish* magazine. The information contained allows me to keep abreast of manufacturing techniques. This knowledge is extremely valuable in discussing current problems and "drawing board" appliances with our vendor engineering departments.

My other interest includes the section on your Safe Transit program. The appliance industry was in real need for such a program and the standards established have been a boon to the vital and troublesome problems of adequate packaging.

I would also like to mention that other personnel in this department are quite interested in *finish*, and never fail to read each new issue as received.

C. P. Conley
Service Engineer
Montgomery Ward & Co.

Let me congratulate you on the many years of publishing an extremely intelligent and worthwhile magazine, *finish*. I have read your magazine since the year it began, and there is nothing I look forward to receiving with keener anticipation.

John DeLuca
Purchasing Agent
Henry Waterman & Bros. Corp.

finish magazine is still the best, and far better than the rest.

Frank M. Weber
Foreman
Malleable Iron Range Co.

You are doing a fine job with *finish* magazine. Keep it up.

R. S. Sheldon
Senior Process Engineer
Frigidaire Division, GMC

I look forward to the new *finish* each month. I read it from cover to cover each time, and get a lot of good ideas from it that are very helpful in my line of work.

Jess McCoy
General Foreman
Frigidaire Division, GMC

This is a very fine magazine. I enjoy reading it and usually do a thorough job of it.

P. J. Zilles
Product Manager
Westinghouse Electric Corp.

We used to keep your journal for 6 months and then discard it. This action led to such indignation on the part of our engineers that we now keep all issues. It seems your journal, to our engineers, has the reputation, that "If it isn't in *finish*, it isn't."

Rita A. Maguire
Engineering Librarian
Westinghouse Electric Corp.

Your articles on fabricating and processing materials and products are particularly informative. I look forward to reading them.

J. A. Dahlstrom
Research Engineer
Perfection Stove Co.

We look forward to receiving *finish* magazine as it assists us greatly in our day-to-day problems, and keeps us current on new products and equipment, enabling us to cut costs and improve quality.

S. R. Skrob
Plant Manager
Rheem Manufacturing Co.

These represent only a few of hundreds of comments from *finish* readers which we gratefully acknowledge. Others will be published as space permits.

Metal preparation and finishing at Westinghouse

→ *from Page 49*

The *exterior cabinet,* following cleaning, phosphatizing and drying, gets a seam sealing operation with a plastic compound.

Cabinets are transferred to another conveyor that takes them to the prime coat spray booth. This is a water wash type, with capacity to handle 8 or more sprayers. The first spray station includes a pit to allow the sprayer to stand at a lower level and spray the underside (inverted top) of the refrigerator shell.

The prime coat used is a modified Epon type selected for increased grease resistance, hardness, and resistance to humidity and salt spray.

Pickling Schedule

Tank	*Capacity (gals.)*	*Material*	*Concentration*	*Time in min.*	*Temp. – °F.*
1st cleaner	8,480	Alkali soap	8 oz./gal.	4	212
2nd cleaner	4,240	" "	" " "	3	212
3rd cleaner	8,480	" "	" " "	4	212
Hot rinse	—	Water	Clear	2½	120
Cold rinse	—	Water	Clear	3½	Cold
Acid	12,500	H_2SO_4	6%	4½	150
Acid rinse	4,240	Water	Clear	2	Cold
Nickel	12,720	Ni salt	1 oz./gal.	6	150
Ni rinse spray	—	Water	Clear	1½	Cold
1st neutralizer	5,300	Soda ash Borax	0.8 oz./gal. 0.27 oz./gal.	2½	130
2nd neutralizer	4,240	Borax	0.13 oz./gal.	1½	130
Drier	—	—	—	4	Open

The lower front panel is hung on the same hanger as the outer cabinet, but out-rigged from it at the back to permit the back and lower front panel to be sprayed at the same time. Paint is applied 0.6 to 0.8 thousandths inch thick.

The overspray from this booth is collected in tanks at the back of the booth and reclaimed. This effects a savings of approximately half a million dollars a year.

Prime coat is baked in ovens 760 feet long, fired by natural gas and located above the floor level, second floor mezzanine. Temperatures vary with chain speed, 320° F at 15 ft. per minute being normal.

Cabinets and doors are inspected, and any defects, blemishes or foreign particles in the prime coat are sanded by hand. Dust from the sanding operation is removed by "tack cloth" and compressed air blow-off in preparation for finish coat application.

Finish coat application is in a pressurized spray room (water wash). Here again, overspray is reclaimed. The finish paint is an alkyd-urea-formaldehyde, selected for excellent resistance to grease. It is applied at 1.0 thousandths thickness, giving the refrigerator exterior a total thickness of 1.6 to 2.0 thousandths. The paint used in this booth is piped to the area from the paint mix room below.

Paint mixing room

The paint mix and reclaim department, located on the ground floor, is a model of efficiency in material handling. It is designed to handle

X
CHEMICALS
KLEM
CHEMICALS
You can't tell
the difference by
INSPECTING
the drum!
It's the quality of the job you get and the savings in material, time, heat, etc., that make KLEM chemicals preferred. That's why one of the largest and most modern plating operations in the automotive industry recently chose Klem chemicals in preference to all others. The Klem man in your area may have the answer to your tough problem — if he doesn't the Klem lab does. Send us a sample for trial.
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CHEMICALS, Inc.
14401 LANSON AVE., DEARBORN, MICHIGAN
WRITE FOR THIS CATALOG

Cleaning and Phosphatizing Schedule

Tank	Capacity (gals.)	Material	Concentration	Time in min.	Temp. – °F.
Cleaner	2,330	Emulsion type A Emulsion type B	1 oz./gal. 3/16 oz./gal.	Approx. 1	140-60
Rinse	—	Water	Clear	½	150-70
Rinse	—	Water	Clear	½	120-40
Phosphatizing	1,817	Phosphate	.45#/gal.	1 min.	150-170
Rinse	—	Water	Clear	½	Cold
Final rinse	—	Chromic acid and/or phosphoric acid	.01#/gal.	½	150
Dryer	—	Hot Air	—	10	250

raw material in bulk from tank trucks or in 55 gallon drums. The bulk shipments of paint go into one of four giant 4,400-gallon agitated storage tanks. If received in 55 gallon drums the paint is placed on multi-tiered racks by means of a powered lift truck.

Paint storage

Liquid material is pumped from these giant storehouses to any one of eight 600-gallon mixing tanks which serve in duplicate four of the supply systems, thus permitting the refilling of one mixing tank while the other is being used. Material is pumped to spray stations and the unused portion returned through a scavenger system. The pump has excess capacity to provide for a return of approximately four times the quantity consumed. This insures adequate agitation or movement in system.

There are six other mixing tanks, two of which are 600-gallon and four of 250-gallon capacity. These mixing tanks are loaded from 55-gallon drums and serve four other paint systems. These additional systems are: (1) black enamel (condenser and compressor shells), (2) clear coat (wire racks), (3) prime reclaim, and (4) finish reclaim.

Cabinets and doors are brought from the final coat baking oven by conveyor to an inspection station. Here both units get final finish inspection. Doors are transferred to an assembly line feed conveyor for delivery to their proper point on the line. Cabinets are placed on a belt conveyor for delivery to the head of the cabinet assembly line.

Kitchen cabinet . . .

→ *from Page 87*

program is being directed by the Lawrence H. Selz Organization, Inc., public relations counsel of Chicago.

The decision to embark on the education program was made at the last quarterly meeting, the largest in SKCMA history, held at the Park Sheraton Hotel, New York City, March 3.

It happens every day...
BIKES GET A BIG
"BANG"
OUT OF KIDS
One of Junior's biggest thrills comes during a bicycle overhaul job . . . one of the many occasions when the gleaming finish takes a beating.
In designing the Silver King, Monark engineers built in as many "boy-proof" features as possible. They turned to the Arco Research Laboratory for a finish to resist the inevitable scratches and abrasions imposed by normal, eager, energetic kids.
Why not take your finishing problems to ARCO where experienced formulators tailor quality paints to exacting specifications—and pre-prove performance by Arco Cycle Testing, a system which evaluates finishes to a degree unequalled in the industry.
Write for full details.
ARCO PAINTS
Quality... SINCE 1881
TESTED FIRST TO LAST!
THE ARCO COMPANY • CLEVELAND 27, OHIO • LOS ANGELES 1, CAL.
A SUBSIDIARY OF AMERICAN-MARIETTA COMPANY

NEWS ABOUT SUPPLIERS

U. S. STEEL SUPPLY APPTS.

Warren F. Hjerpe has been named assistant district manager of United States Steel Supply Division, it was announced by Clyde B. Colwell, Jr., Chicago district manager. He succeeds Earl L. Simanek, who was promoted to St. Paul district manager.

FEEDALL NAMES PECK S. M.

Under the expansion program of Feedall Machine & Engineering Co., Willoughby, Ohio, the appointment of John Pecek as sales manager was announced by Lewis R. Winslow, president. The firm specializes in the manufacture of automatic hopper feeding equipment.

HAHN ELECTED PRESIDENT OF CITY AUTO STAMPING

William D. Hahn, formerly treasurer, was elected president of The City Auto Stamping Co., Toledo, succeeding Charles C. Bigelow, who died March 31.

Joseph F. Howard was reelected vice president, sales manager and director, and Peter Peterson was reelected executive vice president of The City Machine & Tool Co., Toledo.

HOOD HEADS AMERICAN SILVER ENTRY IN THERMOSTAT FIELD

Entry of American Silver Co., Inc., Flushing, N.Y., into the thermostat metal field has been announced by Monroe Sherman, president. Heading the firm's new thermostat metal division is Stanley R. Hood who has 26 years experience in the thermostat metal field, including positions with W. M. Chace Co. and Metals and Controls Corp. general plate division.

STUBBLEFIELD RETIRES

B. M. Stubblefield, for the last seven years manager of Chicago district operations for The Youngstown Sheet & Tube Co., retired from active service on May 1. He will continue with Y.S.&T. on a consulting basis.

LEAN TO NEW WILCOLATOR POST

Appointment of Walton A. Lean as vice president and technical director of The Wilcolator Co., Elizabeth, N.J., was announced by Robert R. Forrester, Jr., executive vice president. Lean will be responsible for the coordination of sales, engineering and production of gas and electrical controls and thermostatic temperature regulating devices.

ESSAK EXPANDS CHEMICAL DIV., NAMES SIROVY AND LACASSE

Essak Steel & Chemical Co., Chicago, has expanded operations in the metal cleaning field, and has promoted Harry Sirovy to sales manager and appointed Harold LaCasse service manager of the chemical division, according to an announcement by Henry Essak, president.

Sirovy, who has been with Essak since 1950, was formerly with Century Vitreous Enamel Co. LaCasse was formerly with Pennsylvania Salt Mfg. Co. Herman Essak, vice president, continues to head the steel division.

HAROLD LACASSE

HARRY SIROVY

"For the past ten years we have been serving the metal products industry in a number of ways," Essak reported. "To keep pace with demand we have expanded our service department. One of the major customer benefits of this expansion was our decision to set up local warehousing of our widened line of cleaning compounds. . . . In addition, we have widened our line of compounds to simplify metal cleaning and bond coating for the paint, porcelain enamel and electroplating industries," stated Essak.

ERVIN NAMED CINCINNATI BRANCH MGR. FOR FIBERGLAS

Appointment of Howard G. Ervin, Jr., as manager of the Cincinnati branch office of Owens-Corning Fiberglas Corp., was announced by E. W. "Pat" Smith, vice president of sales branch operations. Ervin, who succeeds F. Gilbert Baechle who resigned, had handled sales programs for the Cincinnati office.

CORONA TO EXPAND SALES OF MERCO INDUSTRIAL OVENS

Horace H. Wagner, director of sales, Corona Mfg. Corp., Glendale, Calif., local infra-red industrial oven manufacturer, has announced that Corona will expand sales effort to cover the United States and its territories.

Under agreement with Merco In-

H. H. WAGNER

F. H. HOLT

H. G. ERVIN, JR.

WILLIAM D. HAHN

WALTON A. LEAN

STANLEY R. HOOD

W. N. NOBLE

W. R. SEELEY

dustries, of Seattle, Corona will have exclusive license for the Merco infra "Pyrex" tube heater in the industrial oven field. Plans are underway to consolidate Merco regional distributors and to institute an intensive sales promotion program.

JENNER JOINS MICRO SWITCH

R. R. "Dick" Jenner, formerly chief radio and electronics engineer for Beech Aircraft Co., has been named to the new post of director of airborne products for Micro Switch, of Freeport, Ill., a division of Minneapolis-Honeywell Regulator Co.

SELZ TO HEAD GENERAL AMERICAN PLASTICS DIV.

Frank E. Selz, assistant to the president since 1945, has been elected vice president in charge of the plastics division of General American Transportation Corp., Chicago. He is also a director of The Society of the Plastics Industry.

NEW PENN CONTROLS PRESIDENT

The board of directors of Penn Controls, Inc., Goshen, Ind., has appointed Ralph S. Penn president to succeed Albert Penn who was named chairman.

FERRO ELECTRIC NAMES SEELEY SALES MANAGER

Appointment of W. R. Seeley as sales manager of Ferro Electric Products, Inc., Kirkland, Ill., has been announced by D. V. Tuttle, executive vice president and general manager.

Seeley has been with Ferro Electric for five years, three years as manager of quality control, and one and one-half years as sales engineer. He was formerly assistant to the works manager and chief inspector of Ice Cooling Appliance Corp.

ARMCO'S FINKBONE HONORED

B. F. Finkbone, product engineer, research division, Armco Steel Corp., was presented with the 5th annual merit award of the Galvanizer's Committee of the American Zinc Institute at the group's annual meeting in St. Louis, April 20.

FERRO NAMES NOBLE V. P.; MARKS, BOARD MEMBER

Ferro Corp., Cleveland, has named William N. Noble vice president in charge of the porcelain enamel frit and glaze frit divisions and its branch plants in Nashville and Los Angeles. He formerly was manager of operations for the frit and glaze producing plants.

H. T. Marks, Ferro administrative vice president, was named to the board of directors along with A. T. Colwell, vice president and board member of Thompson Products, Inc.

ACP TO AWARD SCHOLARSHIPS

American Chemical Paint Co. has announced that it will present college scholarships of four years' duration to two Ambler (Pa.) Joint High School graduates. One scholarship will be for study in the field of chemistry, or chemical engineering; the other will be in agriculture.

PENNSALT KEY APPOINTMENTS

Pennsylvania Salt Mfg. Co. has announced the election of Dr. William A. LaLande, Jr. as vice president. He will also continue as manager of research and development.

Albert H. Clem, president of Pennsalt chemical specialties division, announced the following appointments: Paul C. Hurley, manager of advertising, will be responsible for advertising, sales promotion and market research. E. S. Garverich will serve as technical director in charge of technical service and product development.

HOLT APPOINTED GEN. MGR. OF G-E APPLIANCE CONTROL DEPT.

Frederic H. Holt, of Schenectady, N.Y., has been appointed general manager of the appliance control department of General Electric Co., it was announced by H. A. MacKinnon, G-E vice president. Headquarters for the department are in Morrison, Ill.

AMERICAN HARD RUBBER MERGES TWO DIVISIONS

American Hard Rubber Co., New York City, has merged its chemical equipment and plastics divisions. George H. Reed, formerly manager of plastics division, is now in charge of the combined hard rubber and plastics operations.

JAMES TO HEAD SALES FOR FERRO POWDERED METALS

C. D. Clawson, president, Ferro Corp., has announced the appointment of Albert James as general sales manager of Ferro Powdered Metals, Inc., Salem, Ind., manufacturer of machine parts and a wholly-owned Ferro subsidiary.

Other appointments include E. Raymond Engstrand, chief metallurgist; John W. Polonetz, chief development engineer; Joseph W. Farmer, chief engineer; and Lester Speichoff, master mechanic.

***Distinguished Salesman Award** — was presented to P. J. Buettner (left), Pemco's St. Louis area sales engineer, at annual dinner of Baltimore chapter of National Sales Executives Council. Herbert Turk, Pemco executive vice president, watches as James A. Farley makes the presentation.*

Tool engineers hold annual technical meeting

(Continued from Page 59)

metals in one of industry's most progressive processes, according to Kingsley Drone, chief engineer, Hufford Machine Works, Inc.

In stretching steel to shapes outlined by dies, he pointed out that friction must be at a minimum if sleek surfaces, such as those required for aircraft bodies, are to be achieved.

Methods of lubrication include, in addition to the items better known to the public as kitchen items, water-soluble oils, and commercial waxes and lubricants. Wax paper is used in conjunction with oil, Drone said, but must be replaced frequently.

"Silent sound" metal cleaning

Dr. William L. McCracken, director of research, Detrex Corp., told the engineers how silent sound can make metal surfaces cleaner than a whistle.

"Too often removal of soil from metal surfaces is an expensive hand wiping operation. By converting electrical energy to sound energy, both hand wiping and soil are eliminated," noted McCracken, who cited one example where vapor spray degreasing plus ultrasonics removed 15 times more surface soil than the method being used in the plant prior to the test.

Chromate treatment for metals

Thin films that reduce rust on metals and provide an excellent base for oil paints were described by C. W. Ostrander, service manager, Allied Research Products, Inc., who discussed chromate conversion coatings which may be colored or clear, and also may be bleached off to give a surface for nickel or chrome plating.

Airless blast cleaning with apricot pits

Over 300 pounds of cast iron or apricot pits hurled against a metal surface per minute by whirling blades is typical of the airless blasting method for cleaning metals, reported F. W. Pedrotty, manager of application engineering, American Wheelabrator & Equipment Corp.

He said new records of efficiency were being set by airless blasting machines. With this method, he added, a 15 hp. motor can throw as much abrasive in a minute as the sandblast method could by using a 190 hp. air compressor.

Induction heating

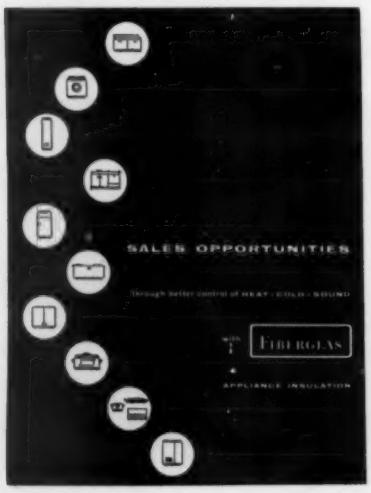
Induction heating uses high voltage electric currents, without ever touching the metal, to add strength to already strong metals, according to R. S. Segsworth, director of research, General Engineering Co., Ltd., who emphasized the advantage of using "dual frequency" induction heating for reaching high temperatures on steel and for heat treatment.

"Dual frequency induction heating is especially desirable where uniform temperatures are necessary. Simultaneously, one frequency can be applied to a thick section of a piece while another frequency is being applied to a thin section," Segsworth added.

New Literature

601. Appliance insulation booklet

New This new eight-page booklet describes sales opportunities created by use of Fiberglas insulation in home appliances. Prepared primarily for appliance designers, the booklet lists the various design problems and their solutions through use of insulations to control either heat, color or sound. Design data for three different types of Fiberglas insulation used in appliances and a number of illustrations are included in the booklet.



602. Literature on panel-type glass name plates for appliances

New New literature tells how to create in glass the effects which give real life to the finest designs for nameplates, clock faces, control panels, etc., for home appliances and other products.

603. Literature on complete equipment for Safe Transit testing

New Information on a single source for complete equipment for testing under the National Safe Transit Program procedures is now available.

Equipment includes friction-free all-steel incline impact tester; a vibration test and rigid all-steel drop test unit.

604. Catalog and free samples on nameplates, trim, escutcheons

New Catalog and samples on decorative nameplates, trim and escutcheons for home appliances are available upon request. Catalog is especially designed for product engineers of appliance companies.

605. Quick-drying draw lubricant

New Details of a new, quick-drying Drawcote is contained in new free literature. Designed especially for spray application, it can also be applied by brushing, dipping or rolling. The material is said to be non-toxic, non-volative, non-irritating and odorless.

Copies of this new literature will be forwarded following written request to *finish*.